VOLUME 20 / NUMBER 24
DECEMBER 23, 1982
ACC. NOS. N82-33334 TO N82-34341

ASTRONOMY
TL
501
.S42
V.20
NO24

The University of Michigan Astronomy Library

STAR
AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts.*

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remit tances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 20, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through **February 28, 1985.**

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($6.00 domestic; $12.00 foreign). Microfiche are sold at price code A01 ($4.00 domestic; $8.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services, in addition to the distribution of NASA scientific and technical reports and of *STAR* and its cumulative indexes, is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
Attn.: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $50.00 North America; $100.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	-- 1/	-- 2/

A99 - Write for quote

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	30.00	45.00

VOLUME 20 NUMBER 24/DECEMBER 23, 1982

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 3383

02 AERODYNAMICS 3383

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 3387

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 3387

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 3389

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION 3390

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

07 AIRCRAFT PROPULSION AND POWER 3392

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

08 AIRCRAFT STABILITY AND CONTROL 3393

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 3394

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 3395

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

13 ASTRODYNAMICS N.A.

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) N.A.

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air).*

15 LAUNCH VEHICLES AND SPACE VEHICLES 3395

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 3396

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING N.A.

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 3396

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

19 SPACECRAFT INSTRUMENTATION N.A.

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 SPACECRAFT PROPULSION AND POWER 3397

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

CHEMISTRY AND MATERIALS

Includes chemistry and materials. (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) **3398**
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS **3399**
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY **3401**
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS **3408**
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS **3413**
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS **3417**
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) **3419**
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS **3423**
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING **3429**
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER **3433**
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY **3437**
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS **3439**
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING **3441**
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY **3443**
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS **3443**
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) **3452**

43 EARTH RESOURCES **3452**
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION **3457**
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION **3466**
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS **3469**
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY **3475**
Includes weather forecasting and modification.

48 OCEANOGRAPHY **3478**
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **3479**
Includes genetics.

52 AEROSPACE MEDICINE **3482**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **3486**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **3488**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **N.A.**

60 COMPUTER OPERATIONS AND HARDWARE **3496**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **3499**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **3502**
Includes computer networks.

63 CYBERNETICS **3502**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **3503**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **3507**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **3509**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **N.A.**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) **3510**
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS **3510**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS **3512**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **3514**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS **3515**
Includes light phenomena.

75 PLASMA PHYSICS **3518**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS **3523**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **3525**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **3525**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **3525**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **3527**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **N.A.**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **3528**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **3528**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **3528**

89 ASTRONOMY **3529**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **3530**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **3530**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **3531**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **3532**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

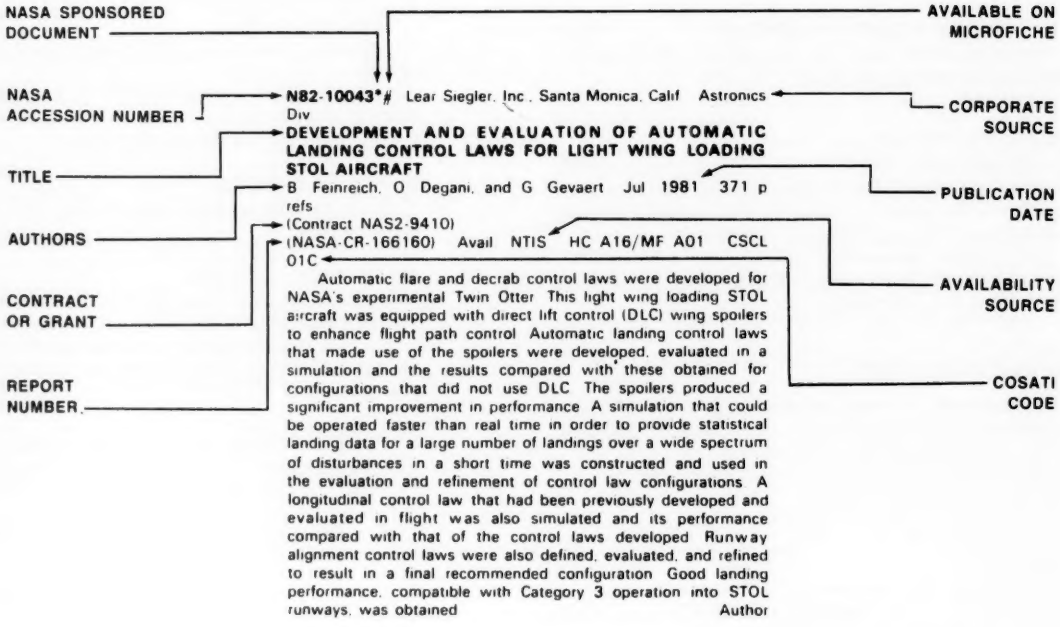
GENERAL

99 GENERAL **3532**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-59**
CORPORATE SOURCE INDEX **I-67**
CONTRACT NUMBER INDEX **I-81**
REPORT/ACCESSION NUMBER INDEX **I-85**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div
CORPORATE SOURCE
TITLE
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
AUTHORS
B. Feinreich, O. Degani, and G. Gevaert Jul 1981 371 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C
AVAILABILITY SOURCE
REPORT NUMBER
COSATI CODE
Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

VOLUME 20 NUMBER 24/DECEMBER 23, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-33334*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RECENT PROGRESS IN VSTOL TECHNOLOGY
Leonard Roberts (Stanford Univ., Calif.) and Wallace R. Deckert Aug. 1982 34 p refs
(NASA-TM-84238; A-8896; NAS 1.15:84238) Avail: NTIS HC A03/MF A01 CSCL 01C

Progress in vertical and short takeoff and landing (V/STOL) aircraft technology, in particular, during the 1970 to 1980 period at Ames Research Center is discussed. Although only two kinds of V/STOL aircraft (the helicopter and the British direct lift Harrier) have achieved operational maturity, understanding of the technology has vastly improved during this 10 year period. To pursue an aggressive R and D program at a reasonable cost, it was decided to conduct extensive large scale testing in wind tunnel and flight simulation facilities, to develop low cost research aircraft using modified airframes or engines, and to involve other agencies and industry contractors in joint technical and funding arrangements. The STOL investigations include exploring STOL performance using the rotating cylinder flap concept, the augmentor wing, upon initiation of the Quiet Short Haul Research Aircraft program, the upper surface blown flap concept. The VTOL investigations were conducted using a tilt rotor aircraft, resulting in the XV-15 tilt rotor research aircraft. Direct jet lift is now being considered for application to future supersonic fighter aircraft. M.G.

N82-33335# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AERONAUTICAL KNOWLEDGE (SELECTED ARTICLES)
11 May 1982 35 p Transl. into ENGLISH from Hangkong Zhishi (China), no. 7, 1980 p 2, 3-5, 12-13
(AD-A115649; FTD-ID(RS)T-0300-82) Avail: NTIS HC A03/MF A01 CSCL 22/1

A carrier rocket launch test from China to the Pacific Ocean was announced. The center of the launch trajectory was 7 degrees 0 minutes south latitude and 171 degrees 33 minutes east longitude with a 70 nautical mile circular range. The test was completed successfully. S.L.

N82-33336# Pittsburgh Univ., Dept. of Mathematics and Statistics.
AGE DEPENDENT MINIMAL REPAIR
Henry W. Block, Wagner S. Borges (Sao Paulo Univ., Brazil), and Thomas H. Savits Apr. 1982 23 p refs Sponsored in part by Conselho Nacional de Desenvolvimento Cientifica e Tecnologico
(Contract N00014-76-C-0839)
(AD-A116846; Rept-82-05) Avail: NTIS HC A02/MF A01 CSCL 15/5

The failure process studied in this paper models the following maintained system setting. A piece of equipment is put in operation at time t=0. Each time it fails, a maintenance action is taken which, with probability p(t), is a complete repair or, with probability q(t)=1-p(t), is a minimal repair, where t is the age at failure of the equipment under maintenance. Since availability results are not pursued in this paper, only operating time will be recorded. This is equivalent to assuming that maintenance is executed in negligible time. It is also assumed that complete repairs restore failed items to their good as new condition in such a way that the times between successive complete repairs are independent and identically distributed. The formal development of the model is given in an appendix where the basic facts are established. In section 2, we show that some aging properties of the equipment's life distribution are inherited by the distribution of the time between successive complete repairs under suitable monotonicity of the function p. A counterexample is also given to the conjecture of Brown and Proschan (1980) that the NBUE aging property is also inherited when the function p is constant. In Section 3, some inequalities and further properties of the model are developed which, as in Section 2, extend results obtained by Brown and Proschan. GRA

N82-33337# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
SURVEY AND UPDATE OF F-14A MISSION PROFILES FOR TF30 ENGINE USAGE Final Report
S. M. Cote 30 Apr. 1982 23 p refs
(WI3550000)
(AD-A116831; NADC-82093-60) Avail: NTIS HC A02/MF A01 CSCL 15/5

The mission profiles and maintenance procedures relating to the TF30-P-412 engines have been investigated to find out whether an observed reduction in engine usage was due to different aircraft missions or new flight procedures. A survey of fleet squadron personnel revealed mission profiles are essentially the same; however, fewer air combat engagements and landing practices account for the lower usage. The F-14 role is now more evenly distributed between air combat and intercepts, while the total number of these missions remains constant. A future advanced technology engine in this aircraft is likely to encounter higher usage requirements if there are no throttle cycle restrictions.
Author (GRA)

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-33338*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Engineering.
ROLLING FLOW WIND TUNNEL TESTS OF F-18 AIRCRAFT
Frederick H. Lutze Jun. 1980 246 p refs
(Contract NAS1-15080)

(NASA-CR-169344; NAS 1.26:169344) Avail: NTIS HC A11/MF A01 CSCL 01A

The lateral directional characteristics of an F-18 aircraft was investigated. Aerodynamic derivatives associated with pure roll rate, or the 'p' derivatives were obtained. The model is described and the procedures used to obtain and correct the data, and a graphical presentation of the results are presented. These results include graphs of the lateral directional static stability derivatives versus angle of attack, and the lateral directional force and moment coefficients versus nondimensional roll rate. Results are presented for several configurations including complete, complete without vertical tails, complete without horizontal tails, fuselage wing and fuselage alone. Each of these configuations was tested with and without wing leading edge extensions. The basic control surfaces were deflected and the results were investigated. S.L.

N82-33339*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Engineering.

CURVED FLOW WIND TUNNNEL TEST OF F-18 AIRCRAFT

Frederick H. Lutze Apr. 1980 294 p refs
(Contract NAS1-15080)
(NASA-CR-169345; NAS 1.26:169345; VPI-Aero-108) Avail: NTIS HC A13/MF A01 CSCL 01A

The curved flow capability of a stability wind tunnel was used to investigate the lateral directional characteristics of an F-18 aircraft. The model is described and the procedures used to obtain and correct the data and a graphical presentation of the results are presented. The results include graphs of lateral directional derivatives versus sideslip or static plots, the lateral directional static stability derivatives versus angle of attack, and finally the lateral directional derivatives versus nondimensional yaw rate for different angles of attack and sideslip. Results are presented for several configurations including complete, complete without vertical tails, complete without horizontal tails, fuselage wing and fuselage alone. Each of these were tested with and without wing leading edge extensions. S.L.

N82-33340*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

USER'S MANUAL FOR INTERFACING A LEADING EDGE, VORTEX ROLLUP PROGRAM WITH TWO LINEAR PANEL METHODS

B. M. E. deSilva and R. T. Medan Apr. 1979 98 p refs
(NASA-TM-78584; A-7744; NAS 1.15:78564) Avail: NTIS HC A05/MF A01 CSCL 01A

Sufficient instructions are provided for interfacing the Mangler-Smith, leading edge vortex rollup program with a vortex lattice (POTFAN) method and an advanced higher order, singularity linear analysis for computing the vortex effects for simple canard wing combinations. B.W.

N82-33341# Nielsen Engineering and Research, Inc., Mountain View, Calif.

EULER SOLUTIONS OF SUPERSONIC WING-BODY INTERFERENCE AT HIGH INCIDENCE INCLUDING VORTEX EFFECTS Final Report, 1 Dec. 1080 - 30 Nov. 1981

Jack N. Nielsen, Gary D. Kuhn, and Goetz H. Klopfer Aug. 1982 102 p refs
(Contract N00014-78-C-0490; NR Proj. 061-272)
(NEAR-TR-263) Avail: NTIS HC A06/MF A01

The feasibility of applying the Euler equations to calculating the flow field about a supersonic wing-body combination when body vortices are present as well as separation vortices from the sharp leading edges of the wing panels was examined. In order to start the calculations in the supersonic marching mode, it was necessary to develop solutions for cones with separated flow. Data on the separation line locations for circular cones were correlated to provide boundary conditions for this purpose. A series of calculations for a wing-body combination with delta wings at Mach numbers of 3, 4, and 5 and angles of attack up to 25 deg was made. Some comparisons with experimental pressure distributions and fin load were made with good agreement. Finally, the Euler code was used to evaluate the accuracy of a panel method for calculating the wing-body pressure distributions as influenced by body vortices. M.G.

N82-33342*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

RESULTS OF BUFFET TESTS IN A CRYOGENIC WIND TUNNEL

Richmond P. Boyden and William G. Johnson, Jr. Sep. 1982 51 p refs
(NASA-TM-84520; L-15370; NAS 1.15:84520) Avail: NTIS HC A04/MF A01 CSCL 01A

Buffet tests on two semispan wing models with different leading edge sweep show that it is feasibile to use the standard dynamic wing root bending moment technique in a cryogenic wind tunnel. One model was a slender 65 deg swept delta wing with sharp leading edges. The other model was an unswept wing of aspect ratio 1.5 with a British NPL 9510 airfoil section. The results for the 65 deg swept delta wing indicate the importance of matching the reduced frequency parameter in model tests for planforms which are sensitive to reduced frequency parameter if quantitative buffet measurements are required. The unique ability of a pressurized cryogenic wind tunnel to separate the effects of Reynolds number and of static aeroelastic distortion by variations in the tunnel stagnation temperature and pressure were demonstrated. S.L.

N82-33343# Cambridge Univ. (England). Dept. of Engineering.

SUPERSONIC CASCADE FLOWS WITH SUBSONIC AXIAL MACH NUMBER

A. R. Manwell 1982 42 p refs
(CUED/A-Turbo/TR-110; ISSN-0309-6521) Avail: NTIS HC A03/MF A01

Two dimensional cascade flows which have supersonic velocities at entry are investigated, considering a supersonic velocity component along the axis, assuring that disturbances travel forward into the incident flow. It is assumed that a shock wave springs from the leading edge of each blade and extends downwards to the upper surface of the blade immediately below, with the possibility that these may be variously inclined to the stream, treating blade profiles which are both straight lines and more general curves are treated. The incident flow need not be a uniform stream, therefore very general (steady) periodic flows in a finite region ahead of the face of the cascade are considered. For suitable flow regions, which can be defined in terms of the characteristic coordinates of the incident flow, boundary value problems are formulated for both the family of steady flow solutions under consideration and the corresponding unsteady motions associated with time dependent disturbances. S.L.

N82-33344*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

NASA RESEARCH ON VISCOUS DRAG REDUCTION

Richard H. Petersen and Dal V. Maddalon Aug. 1982 28 p refs Presented at the 13th Congr. of the Intern. Council of the Aeron. Sci. (ICAS)/AIAA Aircraft Systems and Technol. Meeting, Seattle, 22-27 Aug. 1982
(NASA-TM-84518; NAS 1.15:84518) Avail: NTIS HC A03/MF A01 CSCL 01A

Research on natural laminar flow, laminar flow control by suction, and turbulent drag reduction is discussed. Preliminary results suggest that a significant amount of natural laminar flow can be achieved on small, straight wing airplanes. On larger, swept wing aircraft, laminar flow control by distributed suction is expected to result in significant fuel savings. The area over which laminar flow control is applied depends on tradeoffs involving structural complexity, maintenance, and cost. Several methods of reducing turbulent skin friction by altering the turbulence structure itself have shown promise in exploratory testing. The status of these technologies and the benefits of applying them to future aircraft are reviewed. Author

N82-33345*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

FINITE DIFFERENCE MODELING OF ROTOR FLOWS INCLUDING WAKE EFFECTS
F. X. Caradonna, A. Desopper (ONERA, Chatillon, France), and C. Tung Aug. 1982 29 p refs Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif.
(NASA-TM-84280; A-9032; NAS 1.15:84280; AVRADCOM-TR-82-A-13) Avail: NTIS HC A03/MF A01 CSCL 01A

Rotary wing finite difference methods are investigated. The main concern is the specification of boundary conditions to properly account for the effect of the wake on the blade. Examples are given of an approach where wake effects are introduced by specifying an equivalent angle of attack. An alternate approach is also given where discrete vortices are introduced into the finite difference grid. The resulting computations of hovering and high advance ratio cases compare well with experiment. Some consideration is also given to the modeling of low to moderate advance ratio flows. B.W.

N82-33346*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RECENT APPLICATIONS OF THE TRANSONIC WING ANALYSIS COMPUTER CODE, TWING
N. R. Subramamian, Terry L. Holst, and Scott D. Thomas (Informatics General Corp., Palo Alto, Calif.) Aug. 1982 42 p refs
(NASA-TM-84283; A-9035; NAS 1.15:84283) Avail: NTIS HC A03/MF A01 CSCL 01A

An evaluation of the transonic-wing-analysis computer code TWING is given. TWING utilizes a fully implicit approximate factorization iteration scheme to solve the full potential equation in conservative form. A numerical elliptic-solver grid-generation scheme is used to generate the required finite-difference mesh. Several wing configurations were analyzed, and the limits of applicability of this code was evaluated. Comparisons of computed results were made with available experimental data. Results indicate that the code is robust, accurate (when significant viscous effects are not present), and efficient. TWING generally produces solutions an order of magnitude faster than other conservative full potential codes using successive-line overrelaxation. The present method is applicable to a wide range of isolated wing configurations including high-aspect-ratio transport wings and low-aspect-ratio, high-sweep, fighter configurations. R.J.F.

N82-33347*# Cessna Aircraft Co., Vandalia, Ohio. Accessory Div.
IMPACT OF ADVANCED PROPELLER TECHNOLOGY ON AIRCRAFT/MISSION CHARACTERISTICS OF SEVERAL GENERAL AVIATION AIRCRAFT Final Report
Ira D. Keiter Sep. 1982 82 p refs
(Contract NAS3-21719)
(NASA-CR-167984; NAS 1.26:167984) Avail: NTIS HC A05/MF A01 CSCL 01A

Studies of several General Aviation aircraft indicated that the application of advanced technologies to General Aviation propellers can reduce fuel consumption in future aircraft by a significant amount. Propeller blade weight reductions achieved through the use of composites, propeller efficiency and noise improvements achieved through the use of advanced concepts and improved propeller analytical design methods result in aircraft with lower operating cost, acquisition cost and gross weight. Author

N82-33348*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPUTATIONAL AERODYNAMICS AND DESIGN
W. F. Ballhaus, Jr. Aug. 1982 23 p refs
(NASA-TM-84257; A-8954; NAS 1.15:84257) Avail: NTIS HC A02/MF A02 CSCL 01A

The availability of supercomputers and the ingenuity of computational aerodynamics in design, and prospects for continued advancement are assessed. S.L.

N82-33349# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
AERODYNAMIC LOADS ON A BALL-OBTURATED TUBULAR PROJECTILE M.S. Thesis
William Arthur Bry Mar. 1982 68 p refs
(AD-A115756) Avail: NTIS HC A04/MF A01 CSCL 19/1

A tubular projectile is one with a hole bored along its longitudinal axis. The hole presents a problem in getting the round expelled from a gun. Some means of sealing the hole until the round clears the muzzle is required. A ball-obturator offers one practical means of accomplishing this without any accompanying FOD hazard. The ball-obturator, analogous to a common ball-valve, remains closed under the force of the expanding propellant charge and opens as soon as it is released. The high projectile spin rate created in the barrel causes the ball to align its ports with the projectile tube through a complex gyrodynamic motion that is highly dependent upon the external moments relative to the spinning projectile. This study presents results of wind-tunnel tests designed to quantify lift, drag, and moment forces imparted to the projectile by the ball as it transitions to a full open position. Wind-tunnel balance designs are discussed and equations for deduction of forces are presented. Drag and moment coefficients are plotted as functions of ball angle and presented along with Schlieren photographs of the flow at each test point. Techniques for separating tunnel interference from projectile forces are presented along with an uncertainty analysis. GRA

N82-33350# National Aeronautical Establishment, Ottawa (Ontario). High Speed Aerodynamics Lab.
AN EXPERIMENTAL STUDY OF THE TRANSONIC EQUIVALENCE RULE WITH LIFT
Y. Y. Chan Mar. 1982 71 p refs
(AD-A117019; NAE-LR-609; NRC-20225) Avail: NTIS HC A04/MF A01 CSCL 20/4

The transonic equivalence rule with lift has been studied experimentally. Under the conditions defined by the rule, wing-body models with the same cross-sectional area distribution but with wings of different aspect ratios and thicknesses were tested at transonic speeds. The correlations of the lift depending wave drag and the lift parameter for the models are found to be similar. The similitude of the outer flow field under the same lifting condition is also established. The drag-rise of the equivalent body of revolution with the cross-sectional area distribution including that due to lift correlates well with those of the wing-body models at the design lift condition. The experiment therefore verifies the transonic equivalence rule at lifting condition. Author (GRA)

N82-33351# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
WIND-TUNNEL DRAG MEASUREMENTS OF A BALL-OBTURATED TUBULAR PROJECTILE Final Report
Robert H. Nunn and W. A. Bry Jun. 1982 30 p refs
(Contract N60530-81-WR-30044; SF32300000)
(AD-A117268; NPS69-82-002) Avail: NTIS HC A03/MF A01 CSCL 19/1

Drag measurements and Schlileren flow visualizations have been obtained for a prototype ball-obturated tubular projectile. The test range included Mach numbers of 1.94, 2.88, and 4.00 and a full range of obturator positions was surveyed at each Mach number. The results indicate that with the ball partially open the projectile internal flow field is severely complicated by combined viscous and shock wave interactions. A large of the drag reduction due to ball opening is obtained during the final motion o the ball and the partially open condition may lead to drags above those of the standatrd projectile, particularly at the lower Mach numbers. With the ball closed, the projectile configuration is dominated by bluff-body drag on the ball itself may be estimated by the previously espoused theory. Author (GRA)

N82-33352# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
TRAILING VORTICES IN STRATIFIED FLUIDS Progress Report, 1 Jan. - 30 Jun. 1982
Turgut Sarpkaya and Steven Kenneth Johnson Jun. 1982 166 p refs

(ARPA Order 3925)
(AD-A117040; NPS69-82-003) Avail: NTIS HC A08/MF A01 CSCL 20/4

Experiments were conducted with two Delta wings and a streamlined body with lifting surfaces to investigate the evolution of turbulent trailing vortices in stratified and unstratified water. The vortex trajectories were determined as a function of the relative depth D/b sub o, normalized time V sub o t/b sub o, and the stratification parameter Nb sub o/V sub o. The results have shown that the vortices rise only to a finite height as they gradually demise under the influence of turbulence, sinusoidal instability, and the vortex breakdown. The effect of stratification is to reduce the lifespan of vortices and the maximum height attained by them. Various approximate analyses have been examined and new ones have been proposed to determine the lifespan of the vortices. Finally, an exploratory numerical analysis of the two dimensional, unsteady laminar vortices has been carried out with encouraging results. Author (GRA)

N82-33353# Ballistic Research Labs., Aberdeen Proving Ground, Md.

COMPUTATIONS OF PROJECTILE MAGNUS EFFECT AT TRANSONIC VELOCITIES

Charles J. Nietubicz, Walter B. Sturek, and Karen R. Heavey 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117313) Avail: NTIS HC A02/MF A01 CSCL 19/1

The accurate prediction or experimental determination of projectile aerodynamics is of significant importance to the shell designer and ballistician. The shell designer requires accurate aerodynamic data for the overall development of new shell. The ballistician is concerned with the development of aiming data and therefore relies heavily on accurate aerodynamic data. Experimental costs have sky rocketed in recent years and have contributed significantly to overall system development costs. Computational techniques are beginning to show promise as a means to alleviate or at least temper these rising development costs by providing relatively low cost computer analysis of new designs. As computer technology increases and machines become faster with larger memory, the use of computational methods in design becomes more of a reality. In this paper, recent results are presented for Magnus force computations using the Cray IS computer. Comparisons are made with the earlier CDC computer results and are further compared to some limited experimental data. A discussion of the numerical technique is included. These results represent the first computations of the Magnus effect on projectile shapes in the transonic flight regime. GRA

N82-33354# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.

FLIGHT INSTABILITIES OF SPINNING PROJECTILES HAVING NON-RIGID PAYLOADS

Miles C. Miller 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117311) Avail: NTIS HC A02/MF A01 CSCL 19/1

A laboratory test fixture was designed and fabricated which allowed full-scale 155mm non-rigid payload assemblies to undergo the combined spinning and simple coning motion of the projectile in flight. The resulting despin moment produced by the non-rigid payload was used to evaluate the potential flight stability of a projectile carrying the non-rigid payload. Test fixture evaluation of the partial solid/partial liquid payload indicates that the payload induced despin moment increases non-linearly with both coning frequency and coning angle. The despin moment is independent of canister spin rate providing a minimum spin rate of about 1,000 rpm is present. Below this spin rate, the despin moment is markedly decreased. Modifying the shaping and composition of the solid elements of the payload to restrict their movement reduced the despin moment and the associated flight instability potential. Fixture tests with homogeneous, viscuos liquid fills produced similar despin characteristics to those obtained with the partial solid/partial liquid payloads. The similarity in the instability characteristics due to both the simple homogeneous, viscous liquids and the more complex partial solid/partial liquid non-rigid payloads could aid in the development of a general theory describing the source of the instability and establishing design criteria for future projectile applications. GRA

N82-33355# Ballistic Research Labs., Aberdeen Proving Ground, Md.

NAVIER-STOKES COMPUTATIONS FOR CONVENTIONAL AND HOLLOW PROJECTILE SHAPES AT TRANSONIC VELOCITIES Final Report

Charles J. Nietubicz Jul. 1982 33 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A116866; AD-F300053; ARBRL-MR-03184) Avail: NTIS HC A03/MF A01 CSCL 19/4

Advanced numerical techniques for the prediction of projectile aerodynamics have been applied to standard and hollow projectile shapes. Computer codes developed for solving the time dependent Generalized Axisymmetric and 3-D Thin-Layer Navier-Stokes equations have enabled simultaneous solutions of the inviscid and viscous regions of the flow field. Transonic computations have been performed for a 6-caliber secant-ogive-cylinder-boattail projectile shape at various free stream Mach numbers. Results have been obtained showing the formation of shocks near the nose-cylinder and cylinder-boattail junctions as well as the movement of these shocks with varying free stream conditions. Surface pressure distributions and velocity profiles have been obtained and are compared with available experimental data for angle of attack, alpha = O. Additional results are shown for alpha = 2 degrees, Mach = 0.96. The General geometry capability of the present method enables computations to be performed for many unique shapes such as hollow projectiles or ring airfoils. Internal and external pressure distributions are presented for a ring airfoil shape from Mach = 0.70 through Mach = 0.90. GRA

N82-33356# Army Natick Research and Development Command, Mass.

DEVELOPMENT OF METHODS FOR ASSESSMENT OF GLIDING PARACHUTE APPLICATIONS

Thomas F. Goodrick 18 Jun. 1982 14 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117103) Avail: NTIS HC A02/MF A01 CSCL 01/3

In order to assess the possible utility of gliding parachutes, it was necessary to develop a set of methods for predicting behavior of gliding parachutes. The extent of agreement between simulation and flight data indicates that the primary factors included in the longitudinal stability analysis and in the 6DOF simulation are correct. Although the stability analysis predicts only steady-state behavior, it forms the basis required for analysis of dynamic behavior in the body-fixed XZ plane. The agreement seen in descent rate would not be possible with an invalid stability model. Of course, in turning flight during the response immediately following the deflection, other factors such as the assumed spanwise distribution of lift and drag become predominant. The agreement in yaw rate best illustrates correctness of this aspect of the 6DOF model. The mechanics driving motion during a spin are quite difficult to understand; however, the agreement shown in the descent rate indicates that the mass ratios assumed are acccurate and further justifies the assumption of spanwise distribution of lift and drag. In further development activities on gliding parachute systems, the 6DOF model will serve to guide exploratory work and will be updated for more accurate application to different canopies and to larger systems. GRA

N82-33357# Army Research and Technology Labs., Fort Eustis, Va. Structures Lab.

THE AERODYNAMIC INFLUENCES OF ROTOR BLADE TAPER, TWIST, AIRFOILS AND SOLIDITY ON HOVER AND FORWARD FLIGHT PERFORMANCE

Gene J. Bingham 18 Jun. 1982 14 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117397) Avail: NTIS HC A02/MF A01 CSCL 01/3

The study began with the design of an advanced rotor for the UH-1 helicopter. The initial design goal was to reduce hover power

required by 8% without degrading forward flight performance. This reduction was to be accomplished with an aircraft gross weight of 8050 pounds while operating at an altitude of 4000 feet and a temperature of 95 deg F. The study indicated that the design goal could be exceeded. Based on this result, models of the baseline and advanced blade have been evaluated in the Langley V/STOL wind tunnel and the analytical study has been extended to other helicopter configurations within the US Army inventory. This paper is to describe the design philosophy applied. The influence of blade planform and twist on rotor performance are considered first for hover and then for forward flight. These influences initially are made independent of airfoil characteristics; after the influences of blade geometry are described, the airfoil requirements are addressed. GRA

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N82-33358# RAND Corp., Santa Monica, Calif.
REFLECTIONS ON AN F-43 IN FLIGHT EMERGENCY
Benjamin S. Lambeth Dec. 1981 13 p refs
(AD-A116873; RAND/P-6682) Avail: NTIS HC A02/MF A01 CSCL 01/2

This paper summarizes the highlights of an emergency that occurred on 1 May 1981 in an F-4C assigned to the 159th Tactical Fighter Group, Louisiana Air National Guard. The aircraft, in which the author was flying as an observer, sustained structural damage during the course of a severe out-of-control gyration caused by extremely violent uncommanded pitch oscillations during high-speed, low-altitude flight. Following these events, the aircraft was returned to controlled flight and safely landed at NAS New Orleans. The author is a senior staff member of The Rand Corporation specializing in operational matters of concern to the tactical air forces. He was flying in the aircraft that experienced the emergency with the approval of the National Guard Bureau to enhance his appreciation of fighter employment techniques in connection with his work on Rand's Project AIR FORCE research contract. He has written previously on Soviet and Israeli tactical fighter training and is currently engaged in a study of threat issues bearing on USAF fighter force modernization. Although a civilian with no military background, he has flown extensively in numerous types of USAF fighter aircraft and is a licensed FAA Private Pilot. GRA

N82-33359# Rockwell International Corp., Los Angeles, Calif. Aircraft Div.
INVESTIGATION OF AIRCREW PROTECTION DURING EMERGENCY ESCAPE AT DYNAMIC PRESSURES UP TO 1600 Q Final Report, 19 May 1980 - 22 Feb. 1981
Robert J. Cummings Wright-Patterson AFB, Ohio AMRL May 1982 72 p refs
(Contract F33615-80-C-0513; AF Proj. 7231)
(AD-A117552; NA-80-871; AFAMRL-TR-81-71) Avail: NTIS HC A04/MF A01 CSCL 01/2

A perspective is developed on requirements for applied biomechanical research necessary to support development of new advanced escape capability for negative static stability margin aircraft. Processes which govern potentially injurious energy transfers to and from the ejectee are enumerated. Four escape design approaches are evaluated in terms of energy transfers, protection strategies, and research requirements, including: (1) advanced open upright seat; (2) reclined open; (3) partially encapsulated; (4) encapsulated. GRA

N82-33360# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
EXAMINATION OF AIRCRAFT INTERIOR EMERGENCY LIGHTING IN A POSTCRASH FIRE ENVIRONMENT Final Report, Mar. 1978 - Dec. 1980
James Demaree Jun. 1982 53 p refs
(FAA Proj. 181-350-320)
(AD-A117629; FAA-CT-82-55) Avail: NTIS HC A04/MF A01 CSCL 13/1

This report describes the effectiveness of emergency interior lighting in a wide-body aircraft test fuselage subjected to elevated temperatures and dense smoke generated by an external fuel fire and interior materials fire. Photometric measurements show significant smoke stratification. The dense smoke at the ceiling can reduce the effectiveness of emergency lighting sources in the upper one third of the aircraft cabin in the very early stages of a cabin fire, while temperatures are survivable in the lower two thirds of the cabin. Placing emergency lighting sources at or below the height of the passenger seat armrest can increase the time span over which the lights are effective. Author (GRA)

N82-33361# Dayton Univ., Ohio.
DAYTON AIRCRAFT CABIN FIRE MODEL, VERSION 3. VOLUME 1: PHYSICAL DESCRIPTION Final Report, 1 Apr. 1980 - 31 Mar. 1981
Charles D. MacArthur Jun. 1982 57 p refs 2 Vol.
(Contract DOT-FA74WA-3532)
(AD-A117905; UDRI-TR-81-159-Vol-1; FAA-CT-81-69-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 01/2

Version 3 of the Dayton Aircraft cabin Fire Model (DACFIR) has been created as a refinement and generalization of earlier mathematical models for the computer simulation of fire growth in the cabin of a commercial transport airplane. The model uses data from laboratory tests on the cabin furnishing materials and a zone (control volume) representation of the cabin atmosphere to predict the accumulation of heat, smoke, and gases resulting from arbitrary ignition sources specified in the program input. The major improvements included in Version 3 are a revised cabin atmosphere model which allows for multiple compartments and the prescribed entry of exterior fire gases, and an implicit numerical integration technique for the atmosphere equations. Volume I of this report contains a full description of the model's predictions to the results of three full-scale cabin fire tests. Volume II consists of appendices which include a user's guide and listing of the computer code. Author (GRA)

N82-33362# Federal Aviation Administration, Washington, D.C. Office of Civil Aviation Security.
EFFECTIVENESS OF THE CIVIL AVIATION SECURITY PROGRAM Semiannual Report, 1 Jul. - 31 Dec. 1981
12 Apr. 1982 42 p
(AD-A117671; DOT/FAA/ACS-82-15) Avail: NTIS HC A03/MF A01 CSCL 01/3

The report includes an analysis of the current threat against civil aviation along with information regarding hijacking attempts, security incidents, bomb threats, and passenger screening activity. It also summarizes ongoing activities to assure adequate protection of civil air commerce against hijacking/sabotage and related crimes, and other aspects of the Civil Aviation Security Program. Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N82-33363# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight control Div.
TERRAIN FOLLOWING/TERRAIN AVOIDANCE SYSTEM CON-

CEPT DEVELOPMENT
G. D. Young, Jr., Walter W. Harrington, Roger L. Overdorf, and Elisha Rachovitsky 1982 8 p refs
Avail: NTIS HC A02/MF A01

A proposed system for terrain following/terrain avoidance (TF/TA) is being developed for real time evaluation. The concepts involves a TF/TA and obstacle avoidance sensor suite including: digital landmass simulation data base; a feasible directions guidance algorithm which computes an optimized trajectory based on sensor suite information and satisfies aircraft maneuvering constraints; and a control law which provides tracking of the optimal trajectory for a six degree of freedom aircraft. The design approach is being applied to the advanced fighter technology integration AFTI/F-16 aircraft. Initial work in preparing for real time simulation concentrated on the trajectory algorithm and its software implementation. The algorithm was exercised in a TF only mode for comparison against current systems. A.R.H.

N82-33364*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PROTOTYPE DESIGN AND INITIAL TEST EVALUATION OF A GLOBAL POSITIONING SYSTEM TIME TRANSFER RECEIVER (GPS TTR) Interim Report
O. Jay Oaks, Jr., Alick H. Frank, Stanley R. Falvey, Mark J. Lister, James A. Buisson, S. Clark Wardrip, and Hugh F. Warren (Bendix Field Engineering Corp.) 27 Jul. 1982 18 p refs Prepared in cooperation with Naval Research Lab., Washington, D.C.
(NASA-TM-84721; NAS 1.15:84721; AD-A117909; NRL-8608) Avail: NTIS HC A02/MF A01 CSCL 17/7

Time-transfer equipment and techniques used with the NRL Navigation Technology Satellites have been modified and extended for use with the GPS satellites. A prototype receiver was built and field tested at NASA's Kennedy Spaceflight Center. The receiver uses the GPS L-band link at 1575 MHz with only the course-acquisition code to resolve a measured range to the satellite. A theoretical range is computed from the satellite ephemeris transmitted in the data message and the user's coordinates. Results of user offset from GPS time are obtained by differencing the measured and theoretical ranges and applying calibration corrections. Author (GRA)

N82-33365# Facility Checking Squadron (1866th) (AFCS), Scott AFB, Ill.
TRACALS EVALUATION REPORT. SPECIAL REPORT: A PROCEDURE FOR RTT POSITION IMPROVEMENT USING LINEAR REGRESSION ANALYSIS OF GLIDE SLOPE STRUCTURE Final Report
Harvey J. Leister 30 May 1982 70 p
(AD-A115926; Rept-82/66S-277) Avail: NTIS HC A04/MF A01 CSCL 17/7

This report presents a method to improve the position of a Radio Telemetering Theodolite (RTT) through an analysis by linear regression of the observed glide path structure of an instrument landing system. A complete derivation of the procedure is also presented, including examples testing the procedure at different glide slope facilities. These tests validated the procedure as well as revealed the limitations of its use. The procedure may be used to establish a permanent optimum RTT location for future use when commissioning new glide slope facilities exhibiting marginal performance and/or requiring Category II operation. Author (GRA)

N82-33366# Flight Safety Foundation, Inc., Arlington, Va.
A SAFETY APPRAISAL OF THE AIR TRAFFIC CONTROL SYSTEM
John H. Enders 29 Jan. 1982 77 p refs
(Contract DTFA01-81-C-10109)
(AD-A115743; FSF-ATC-1142-1-82U) Avail: NTIS HC A05/MF A01 CSCL 17/7

In August 1981, the FAA Administrator, Lynn Helms, requested the Flight Safety Foundation to evaluate the safety of the U.S. Air Traffic Control system during the period following the August 3 strike to air traffic controllers. The evaluation was to provide the Administrator with an independent and objective appraisal of the strengths and weaknesses of the existing air traffic control system during the period of approximately late-August to mid December 1981, and to inform the Administrator of the findings of this appraisal as the developed. Presented in the following pages are the results of this 120-day appraisal conducted by the Flight Safety Foundation. Factors examined pertained to safety, management, fatigue, morale, and rehiring. GRA

N82-33367# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
NORTHEAST CORRIDOR HELICOPTER AREA NAVIGATION ACCURACY EVALUATION Data Report, Jul. 1979 - Apr. 1980
Jack D. Edmonds Jun. 1982 36 p refs
(FAA Proj. 045-330-130)
(AD-A117445; FAA-CT-82-57) Avail: NTIS HC A03/MF A01 CSCL 01/2

This report presents area reduced navigation accuracy test flight data collected along an experimental area naviation route structure - the so-called Northeast Corridor. This corridor is an experimental helicopter airway structure extending between Washington, D.C., and Boston, Mass. It contains of 2 one-way, reduced width (4 nautical miles (nmi)) airways including one route spur from Allentown, Pa. These flight tests were a joint effort of the Federal Aviation Administration and the Helicopter Association International (HAI). The objective was to determine if the NEC could be navigated within the 4-nmi airway boundary at the 95 percent confidence level required by Advisory Circular (AC) 90-45A, "Approval of Area Navigation Systems for Use in the U.S. National Airspace System." GRA

N82-33368# Federal Aviation Administration, Washington, D.C. Systems Research and Development Service.
STUDY OF THE FREQUENCY ASSIGNMENT CONGESTION IN THE ULTRA HIGH FREQUENCY AIR TRAFFIC CONTROL AIR/GROUND COMMUNICATION BAND Final Report
Charles W. Cram Apr. 1982 32 p refs
(AD-A117640; DOT/FAA/RD-82/29) Avail: NTIS HC A03/MF A01 CSCL 17/7

To provide air traffic control of military aircraft operating in the National Airspace System, the Federal Aviation Administration (FAA) makes use of frequencies in the 225 - 400 MHz (UHF) band which is normally administered by the Department of Defense. In 1970 the Military Communications and Electronics Board (MCEB) announced their intention to implement 25 kHz channel spacing in the UHF band. In 1976, the MCEB published an implementation plan which allotted 274 channels for use by the FAA for air traffic control. The purpose of the following study is to determine if the 274 channels made available will be sufficient to satisfy existing and future communication requirements for air traffic control of military aircraft. The study will also show how much additional spectrum support would be required if the 274 channels allotted are not sufficient and possible geographic areas where this additional support would be most necessary. GRA

N82-33369# Federal Aviation Administration, Washington, D.C. Office Systems Engineering Management.
PRELIMINARY ANALYSIS OF THE BENEFITS AND COSTS TO IMPLEMENT THE NATIONAL AIRSPACE SYSTEM PLAN
S. M. Horowitz and S. B. Poritzky Jun. 1982 62 p
(AD-A117664; FAA-EM-82-22) Avail: NTIS HC A04/MF A01 CSCL 17/7

The many individual programs which comprise the National Airspace System Plan are designed to provide more air traffic control service to the aviation users at reduced operating costs to the FAA. The FAA is able to justify its investment in the NAS Plan by a cost/effectiveness argument. The benefits and costs to the aviation users are the focus of this report. By using example cases to quantify a portion of the potential dollar benefits that would be available to the aviation user as a result of the FAA's implementation of its NAS Plan, this report concludes that the added benefits to the users exceed the users' added costs in avionics equipment by a large margin. Author (GRA)

N82-33370# Federal Aviation Administration, Atlantic City, N.J.
IMPROVING CONFLICT ALERT PERFORMANCE USING MOVING TARGET DETECTOR DATA Final Report, Oct. 1979 - Sep. 1980
Robert E. Lefferts Jun. 1982 85 p refs
(AD-A117691; FAA-CT-81-17; FAA-RD-81-47) Avail: NTIS HC A05/MF A01 CSCL 17/9

The feasibility of using measurements of aircraft radial velocity to improve the performance of the en route tracking algorithm in the present computational environment was examined. Radial velocity can be measured with equipment which is part of the Moving Target Detector (MTD) radar, a new type of search radar. Particular attention is paid in this report to the utilization of radial velocity in reducing speed and heading biases that occur during maneuvers. The performance of the tracking and Conflict Alert algorithms is evaluated on five maneuver detection/observation methods, including the present method. Using both standard and track-oriented parameters yields a total of ten different analyses. A simplified simulation program produces quantitative data. Because the computational resources available for tracking algorithm modifications are limited, consideration of possible applications of radial velocity measurements is restricted to simple algorithm changes. Two aspects of performance are measured: the warning time to a hazardous situation, and the nuisance alert area, a recently developed measure of the false alarm performance of the algorithms. It was concluded that the use of the radial velocity data was not justified in the present systems givent the limited computer resources available. The practically of using radial velocity data in the more extensive system of the future is briefly considered. Author (GRA)

N82-33371# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
FAA AIR TRAFFIC ACTIVITY, FY 1981
Patricia Carter and Nancy Trembley 30 Sep. 1981 234 p
(PB82-200361; AMS-220) Avail: NTIS HC A11/MF A01 CSCL 17G

Terminal and enroute air traffic activity information of the national airspace system is furnished. The data was reported by the airport traffic control towers, air route traffic control centers, flight service stations, combined station towers, international flight service stations, and approach control facilities. GRA

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-33372*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FAMILY OF AIRFOIL SHAPES FOR ROTATING BLADES Patent Application
Kevin W. Noonan, inventor (to NASA) Filed 25 Jun. 1982 23 p
(NASA-Case-LAR-12843-1; US-Patent-Appl-SN-392096) Avail: NTIS HC A02/MF A01 CSCL 01C

A rotor blade used primarily for a helicopter which has airfoil sections and an overall configuration of a particular shape is described. The upper surface of the airfoil section is shaped such that there is a general reduction in the surface slope from the leading edge to the maximum ordinate at approximately 35% chord. Behind the termination of positive slope, the upper surface slope is negative and decreases continuously to a position of about 70% chord, at which point the surface slope increases continuously to the trailing edge. From the point the lower surface leading edge fairs into the lower surface, the lower surface slope is negative and increases continuously to approximately the 44% chord. The lower surface slope is positive and increases continuously to about the 65% chord, aft of which the positive slope decreases continuously to about the 75% chord. The positive slope then increases continuously from 75% chord to the airfoil trailing edge. The rotor airfoil is shaped to maintain desired values of pitching moment coefficient over a wide range of lift coefficients and increase the drag divergence Mach number, resulting in increased power efficiency and blade stability. NASA

N82-33373*# Molusis (John A.), Ashford, Conn.
ROTORCRAFT BLADE MODE DAMPING IDENTIFICATION FROM RANDOM RESPONSES USING A RECURSIVE MAXIMUM LIKELIHOOD ALGORITHM Final Report
John A. Molusis Sep. 1982 49 p refs
(NASA Order L-26971-B)
(NASA-CR-3600; NAS 1.26:3600) Avail: NTIS HC A03/MF A01 CSCL 01C

An on line technique is presented for the identification of rotor blade modal damping and frequency from rotorcraft random response test data. The identification technique is based upon a recursive maximum likelihood (RML) algorithm, which is demonstrated to have excellent convergence characteristics in the presence of random measurement noise and random excitation. The RML technique requires virtually no user interaction, provides accurate confidence bands on the parameter estimates, and can be used for continuous monitoring of modal damping during wind tunnel or flight testing. Results are presented from simulation random response data which quantify the identified parameter convergence behavior for various levels of random excitation. The data length required for acceptable parameter accuracy is shown to depend upon the amplitude of random response and the modal damping level. Random response amplitudes of 1.25 degrees to .05 degrees are investigated. The RML technique is applied to hingeless rotor test data. The inplane lag regressing mode is identified at different rotor speeds. The identification from the test data is compared with the simulation results and with other available estimates of frequency and damping. S.L.

N82-33374*# Washington Univ., St. Louis, Mo. Dept. of Mechanical Engineering.
DESIGN OF HELICOPTER ROTOR BLADES FOR OPTIMUM DYNAMIC CHARACTERISTICS Semiannual Status Report, 18 Jan. - 16 Jul. 1982
David A. Peters, Timothy Ko, Alfred E. Korn, and Mark P. Rossow 15 Sep. 1982 33 p refs Prepared in cooperation with Univ. of Southern Illinois, Edwardsville
(Grant NAG1-250)
(NASA-CR-169352; NAS 1.26:169352; SASR-1) Avail: NTIS HC A03/MF A01 CSCL 01C

The possibilities and the limitations of tailoring blade mass and stiffness distributions to give an optimum blade design in terms of weight, inertia, and dynamic characteristics are investigated. Changes in mass or stiffness distribution used to place rotor frequencies at desired locations are determined. Theoretical limits to the amount of frequency shift are established. Realistic constraints on blade properties based on weight, mass moment of inertia size, strength, and stability are formulated. The extent hub loads can be minimized by proper choice of EL distribution is determined. Configurations that are simple enough to yield clear, fundamental insights into the structural mechanisms but which are sufficiently complex to result in a realistic result for an optimum rotor blade are emphasized. S.L.

N82-33375*# Douglas Aircraft Co., Inc., Long Beach, Calif.
ADVANCED TURBOPROP TESTBED SYSTEMS STUDY Final Report
I. M. Goldsmith Jul. 1982 255 p refs
(Contract NAS3-22347)
(NASA-CR-167895; NAS 1.26:167895; ACEE-22-FR-1699A) Avail: NTIS HC A12/MF A01 CSCL 01C

The proof of concept, feasibility, and verification of the advanced prop fan and of the integrated advanced prop fan aircraft are established. The use of existing hardware is compatible with having a successfully expedited testbed ready for flight. A prop fan testbed aircraft is definitely feasible and necessary for verification of prop fan/prop fan aircraft integrity. The Allison T701

is most suitable as a propulsor and modification of existing engine and propeller controls are adequate for the testbed. The airframer is considered the logical overall systems integrator of the testbed program. S.L.

N82-33376# Naval Postgraduate School, Monterey, Calif.
INVESTIGATION INTO AIR LAUNCH CRUISE MISSILE (ALCM) FLIGHT INFORMATION LOADING AND DISPLAY TECHNIQUES DURING FLEX TARGETING PROCEDURE M.S. Thesis
John Charles Ruess Mar. 1982 103 p refs
(AD-A115744) Avail: NTIS HC A06/MF A01 CSCL 06/3

The use of a discrete utterance voice recognition system and keyboard entry device in retargeting Air Launch Cruise Missiles prior to launch from a B-52G aircraft are compared. Time to load, input and output accuracies, and time versus accuracy measurements were made for each of twenty subjects. Keyboard entry was found to be better than voice entry in time to load and input accuracy. These findngs are limited to discrete utterance voice recognition systems. Three display formats for presenting flex targeting information on a cathode ray tube were investigated. Information was updated on the cathode ray tube using single space, double space, and inverse video formats. Time to update, input and output accuracies, and time versus accuracy measurements were recorded. GRA

N82-33377# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PRINCIPLES OF THE RADIO CONTROL OF PILOTLESS OBJECTS (SELECTED CHAPTERS)
28 Jun. 1982 254 p Transl. into ENGLISH from the book "Printsipy Radioupravleniya Bespilotnymi Obyektami" Moscow, Sovetskoye Radio, 1959 p 99-225
(AD-A117547; FTD-ID(RS)T-0202-82) Avail: NTIS HC A12/MF A01 CSCL 01/3

The radio control of missiles is discussed in detail with particular emphasis on homing, remote control, and combined control technology. The problem of coordinate system agreement is also addressed. GRA

N82-33378# Arinc Research Corp., Annapolis, Md.
RELIABILITY, AVAILABILITY, MAINTAINABILITY DATA TRACKING PLAN IMPROVED GUARDRAIL 5
S. Jones, R. Foote, and H. Riser Jun. 1982 49 p refs
(Contract DAAB07-78-A-6606)
(AD-A117933; Rept-1599-01-2-2711) Avail: NTIS HC A03/MF A01 CSCL 01/3

The objective of the IGRV RAM Tracking Plan is to provide continuous visibility of fielded equipment RAM performance to permit the PM SEMA to determine failure patterns, identify the necessity for in-depth engineering investigations, and assess the desirability of pursuing RAM improvement measures. The plan is designed to be consistent with the requirements contained in the Reliability, Availability, Maintainability Program Plan for Improved GUARDRAIL V. This IGRV RAM Tracking Plan defines the responsibilities, procedures, resources, and schedules necessary to develop, implement, and maintain a RAM audit trail during the life of the system. Author (GRA)

N82-33379# Systems Planning Corp., Arlington, Va.
ALTERNATIVE EMPLOYMENT CONCEPTS FOR REMOTELY PILOTED VEHICLE (RPV) FLIR/TV MISSION PAYLOAD Final Report
W. G. Howard, W. K. Evans, and S. Shrier Dec. 1981 70 p refs
(Contract DAAK50-80-C-0011)
(AD-A117877; SPC-774) Avail: NTIS HC A04/MF A01 CSCL 01/3

This study compared the operational potential of the RPV organization in a division that has rear area launch and recovery with that in a division that had independent sections. The study found that rear area launch and recovery could provide significant operational advantages including: a smaller basic load of air vehicles, more expeditious resupply of air vehicles, and reduced vulnerability of the ground systems. Reliable communications are required to make the rear area launch and recovery concept effective. Author (GRA)

N82-33380# Army Armament Research and Development Command, Dover, N. J. Technical Support Directorate.
UNIVERSAL TURRET SYSTEM MODEL DETERMINATION AND CONTROLLER PERFORMANCE TESTING Final Report, Oct. 1980 - May 1981
G. A. Strahl and R. A. Peterson Apr. 1982 73 p refs
(AD-A117687; AD-E400809; ARTSD-TR-81005) Avail: NTIS HC A04/MF A01 CSCL 19/5

Objectives of the testing were to obtain necessary data to determine a valid mathematical model for a universal turret system and to test the performance of optimal turret controllers designed and built for the UTS using that model. Two distinct test phases were conducted: the model determination and the controller performance testing. First, the model determination testing is reported, including turret preparation, test plan preparation and modification, and test execution. Then, the optimal controller design and performance testing is covered. Results of both firing and nonfiring tests are reported and analyzed. The frequency response (Bode) plots are compared to derived theoretical results. The UTS optimal controller performance is compared to the performance of the UTS original controller and of the prototype XM97 controllers tested in a previous program by the use of statistical analysis technique. GRA

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N82-33381*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN OPERATIONAL EVALUATION OF HEAD UP DISPLAYS FOR CIVIL TRANSPORT OPERATIONS. NASA/FAA PHASE 3 REPORT Final Report
J. K. Lauber, R. S. Bray, R. L. Harrison, J. C. Hemingway, and B. C. Scott (FAA) Aug. 1982 198 p refs
(NASA-TP-1815; A-8477; NAS 1.60:1815; HUD-16) Avail: NTIS HC A09/MF A01 CSCL 01D

The advantages and disadvantages of head-up displays (HUDs) in commercial jet transport approach and landing operations was evaluated. Ten airline captains currently qualified in the B-727 aircraft flew a series of instrument landing system (ILS) and nonprecision approaches in a motion base simulator using both a flight director HUD concept and a flightpath HUD concept as well as conventional head-down instruments under a variety of environmental and operational conditions to assess: (1) the potential benefits of these HUDs in airline operations; (2) problems which might be associated with their use; and (3) flight crew training requirements and flight crew operating procedures suitable for use with the HUDs. Results are presented in terms of objective simulator based performance measures, subject pilot opinion and rating data, and observer data. Author

N82-33382# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
THE AIDS/F-18 DIFFRACTIVE HUD Interim Report, 1 Oct. 1978 - 31 Mar. 1982
Harold Green 1 Jun. 1982 26 p refs
(AD-A116026; NADC-82147-60) Avail: NTIS HC A03/MF A01 CSCL 01/3

The Human Factors Engineering Division (HFE) of the Aircraft and Crew Systems Technology Directorate (ACSTD) at the Naval Air Development Center (NADC) is currently engaged in the evaluation of a diffractive optics Head-Up Display (HUD). This Advanced Integrated Display System (AIDS) HUD employs a state-of-the-art diffraction-optic or holographic combiner, and

represents the first such system configured for use in a high performance Naval aircraft (F/A-18). The Hughes Aircraft Co. (HAC) of El Segundo, Cal., under the technical direction of HFE at NADC, has developed the AIDS HUD in a three year incremental effort commencing October 1978. The HUD equipment delivered under Contract N62269-78-C-0232 consisted of one pilot's display unit (PDU), a spare holographic combiner, and a spare CRT/deflection yoke. GRA

N82-33383# Army Avionics Research and Development Activity, Fort Monmouth, N. J.
VOICE INTERACTIVE SYSTEMS TECHNOLOGY AVIONICS (VISTA) PROGRAM
Lockwood W. Reed 18 Jun. 1982 10 p Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117288) Avail: NTIS HC A02/MF A01 CSCL 17/2

Although the preliminary test results are encouraging, it must be remembered that they were taken under ideal conditions. For all testing, the microphone was positioned just brushing the test subject's lips; however, a test was run with one test subject placing the microphone approximately four millimeters from the test subject's lips. The test results showed a 50% decrease in recognition accuracy for the same conditions as those with a microphone touching lips. Although the results are preliminary, it is apparent that the signal-to-noise ratio is a key factor in recognition accuracy. Another problem arises because of the automatic gain controls (AGC) found in most aircraft intercom systems. When there is no voicing for a period of time, the AGC increases the intercom sensitivity. If the first utterance spoken is intended for the recognizer it will likely be rejected because of the distortion caused by the AGC adjusting the gain during the utterance. This is demonstrated in the test results of all test subjects. No attempt was made to set the AGC before beginning the test; as a result, 90% of the first utterances were rejected which resulted in the lowering of the accuracy score by approximately 4%. The AGC has a release time of 10 seconds and the prompts are issued every second; therefore, after the first utterance the AGC has little effect. Some side tests were performed by making an utterance before signaling the computer to begin the test, and in each case the accuracy of the first test word increased to a point comparable to the other vocabulary words. GRA

N82-33384# Arinc Research Corp., Annapolis, Md.
DEVELOPMENT OF AVIONICS INSTALLATION INTERFACE STANDARDS Final Report, 1 Jun. - 31 Dec. 1981
C. N. D. Smith, Neil Sullivan, and Atso Savisaar Dec. 1981 167 p refs
(Grant F04606-79-G-0082)
(AD-A116853; Rept-2258-21-3-2595) Avail: NTIS HC A08/MF A01 CSCL 01/3

This report summarizes ARINC Research Corporation's efforts under Air Force Contract F04606-79-G-0082, Delivery Order S706, 'Standard Rack-Mounted and Panel-Mounted Avionics Interface Concepts Analysis.' The period of performance was 1 June 1981 through 31 December 1981. The technical areas addressed were the analysis and specification of rack-mounted avionics, cockpit-mounted control panels, and panel-mounted instruments. Contract tasks included the following: Distribute the draft Packaging, Mounting, and Environment (PME) Standards and other 'working papers' to our mailing list of interested and potential attendees at the open forum; Arrange and conduct a second open forum; Address issues remaining after the second open forum and develop work plans to resolve them; and Continue the development of the PME specification for high-density/high-dissipation avionics packaging. Author (GRA)

N82-33385# Systems Control, Inc., Palo Alto, Calif.
ENHANCEMENTS AND ALGORITHMS FOR AVIONIC INFORMATION PROCESSING SYSTEM DESIGN METHODOLOGY Final Report
K. Doty, A. Lemoine, and P. McEntire 16 Jun. 1982 125 p refs
(Contract N62269-81-C-0477)
(AD-A117948; NADC-81105-50) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report continues the study of both the software allocation and hardware configuration aspects of avionic information processing systems. The previously developed spatial dynamic programming algorithm is enhanced by incorporating task precedence constraints and hardware failures. Stochastic network methods are used to analyze allocations in the presence of random fluctuations. Graph theoretic methods are used to analyze hardware designs, and new designs are constructed with better values of important parameters, such as the graph diameter. Author (GRA)

N82-33386# General Electric Co., Binghamton, N.Y. Aircraft Equipment Div.
NON-COMPLEX ITEM DEVELOPMENT SPECIFICATION FOR A FEASIBILITY MODEL OF AN ELECTRONIC MASTER MONITOR AND ADVISORY DISPLAY SYSTEM (EMMADS) Interim Report, Jun. 1979 - Jun. 1981
Jun. 1981 112 p
(Contract DAAK80-79-C-0270; DA Proj. 1L2-62202-AH-85)
(AD-A117919; ACS-12; Rept-383; USAAVRADCOM-TR-79-0270-4; IR-4) Avail: NTIS HC A06/MF A01 CSCL 01/3

This report is a specification establishing the requirements, quality assurance provisions, and necessary delivery preparations for a feasibility model of an Electronic Master Monitor and Advisory Display System for a CH-47C helicopter. Author (GRA)

N82-33387# Army Research and Technology Labs., Moffett Field, Calif. Aeromechanics Lab.
SPEECH COMMAND AUDITORY DISPLAY SYSTEM (SCADS)
James W. Voorhees, Kristine M. Marchionda, and Valerie L. Atchison 18 Jun. 1982 9 p Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117486) Avail: NTIS HC A02/MF A01 CSCL 01/3

The missions of the helicopter, within both the military and the civil sector, have changed rather dramatically over the last 20 years. The military's experience is Southeast Asia during the 1960's demonstrated the wide range of missions that could be accomplished by rotary wing aircraft: fire fighting, heavy lift, and large scale medical evacuations, as well as tactical missions of troop transport and close air support. The post-Vietnam civilian uses for helicopters have duplicated several of the military missions, resulting in an added interest in helicopters in both the military and the civilian sectors. This increased interest has also led to rapid advances in rotorcraft technology. As helicopters have become much more capable, there has been an increasing sophistication in flight controls, power plant systems, and in cockpit displays. This combination of the increase of types of missions and the increase in cockpit sophistication has created a new set of problems. The limiting factor for many types of helicopter missions is now the pilot; and the limitation appears to be specifically related to information transfer. This information transfer is in the form of aircraft status information to the pilot, and information transfer from the pilot back to the aircraft in the form of control manipulations. Author (GRA)

N82-33388# Boeing Commercial Airplane Co., Seattle, Wash.
AIRCRAFT ALERTING SYSTEMS STANDARDIZATION STUDY. PHASE 4: ACCIDENT IMPLICATIONS ON SYSTEMS DESIGN Final Report, Jul. 1981 - Jun. 1982
D. C. Hanson, W. W. Howison, S. F. Chikos, and B. L. Berson Jun. 1982 121 p refs Prepared in cooperation with Lockheed Aircraft Co., Burbank, Calif. and McDonnell Douglas Corp., St. Louis, Mo.
(Contract DOT-FA79WA-4268)
(AD-A117876; D6-51464; DOT/FAA/RD-82/26) Avail: NTIS HC A06/MF A01 CSCL 01/4

This study, the fourth in a series having evolved from a study of independent altitude monitor requirements and alerting system criteria, has developed a set of substantiated guidelines for the design of aircraft alerting systems. In the course of this work, the FAA concluded that a system which went beyond the function of an alerting system might be useful. The study was extended to examine the question as to whether a system could function as a

monitor of flight safety, a system that could aid the pilots in resolving problems and contribute to reducing the number of future accidents. The study established the feasibility of the concept of complementing the alerting system with a computer to perform the flight phase status monitor function. Author (GRA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-33389*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ROTOR TIP CLEARANCE EFFECTS ON OVERALL AND BLADE-ELEMENT PERFORMANCE OF AXIAL-FLOW TRANSONIC FAN STAGE
Royce D. Moore Sep. 1982 87 p refs
(NASA-TP-2049; E-559; NAS 1.60:2049) Avail: NTIS HC A05/MF A01 CSCL 21E

The effects of tip clearance on the overall and blade-element performance of an axial-flow transonic fan stage are presented. The 50-centimeter-diameter fan was tested at four tip clearances (nonrotating) from 0.061 to 0.178 centimeter. The calculated radial growth of the blades was 0.040 centimeter at design conditions. The decrease in overall stage performance with increasing clearance is attributed to the loss in rotor performance. For the rotor the effects of clearance on performance parameters extended to about 70 percent of blade span from the tip. The stage still margin based on an assumed operating line decreased from 15.3 to 0 percent as the clearance increased from 0.061 to 0.178 centimeter. Author

N82-33390*# Akron Univ., Ohio. Dept. of Mechanical and Civil Engineering.
ENGINE DYNAMIC ANALYSIS WITH GENERAL NONLINEAR FINITE ELEMENT CODES. PART 2: BEARING ELEMENT IMPLEMENTATION OVERALL NUMERICAL CHARACTERISTICS AND BENCHMAKING
J. Padovan, M. Adams, J. Fertis, I. Zeid, and P. Lam Oct. 1982 229 p refs
(Grant NsG-3283)
(NASA-CR-167944; NAS 1.26:167944) Avail: NTIS HC A11/MF A01 CSCL 21E

Finite element codes are used in modelling rotor-bearing-stator structure common to the turbine industry. Engine dynamic simulation is used by developing strategies which enable the use of available finite element codes. benchmarking the elements developed are benchmarked by incorporation into a general purpose code (ADINA); the numerical characteristics of finite element type rotor-bearing-stator simulations are evaluated through the use of various types of explicit/implicit numerical integration operators. Improving the overall numerical efficiency of the procedure is improved. S.L.

N82-33391*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
STRUCTURAL TAILORING OF ENGINE BLADES (STAEBL) Interim Report
C. E. Platt, T. K. Pratt, and K. W. Brown Jun. 1982 359 p refs
(Contract NAS3-22525)
(NASA-CR-167949; NAS 1.26:167949; PWA-5774-21) Avail: NTIS HC A16/MF A01 CSCL 21E

A mathematical optimization procedure was developed for the structural tailoring of engine blades and was used to structurally tailor two engine fan blades constructed of composite materials without midspan shrouds. The first was a solid blade made from superhybrid composites, and the second was a hollow blade with metal matrix composite inlays. Three major computerized functions were needed to complete the procedure: approximate analysis with the established input variables, optimization of an objective function, and refined analysis for design verification. S.L.

N82-33392*# Teledyne Continental Motors, Mobile, Ala. Aircraft Products Div.
EXHAUST EMISSIONS REDUCTION FOR INTERMITTENT COMBUSTION AIRCRAFT ENGINES Final Report
Bernard J. Rezy, Kenneth J. Stuckas, J. Ronald Tucker, and Jay E. Meyers May 1982 55 p refs
(Contract NAS3-19755)
(NASA-CR-167914; NAS 1.26:167914) Avail: NTIS HC A04/MF A01 CSCL 21E

Three concepts which, to an aircraft piston engine, provide reductions in exhaust emissions of hydrocarbons and carbon monoxide while simultaneously improving fuel economy. The three chosen concepts, (1) an improved fuel injection system, (2) an improved cooling cylinder head, and (3) exhaust air injection, when combined, show a synergistic relationship in achieving these goals. In addition, the benefits of variable ignition timing were explored and both dynamometer and flight testing of the final engine configuration were accomplished. S.L.

N82-33393*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
THE CF6 JET ENGINE PERFORMANCE IMPROVEMENT: LOW PRESSURE TURBINE ACTIVE CLEARANCE CONTROL
B. D. Beck and W. A. Fasching Jun. 1982 159 p refs
(Contract NAS3-20629)
(NASA-CR-165557; NAS 1.26:165557; R82AEB462) Avail: NTIS HC A08/MF A01 CSCL 21E

A low pressure turbine (LPT) active clearance control (ACC) cooling system was developed to reduce the fuel consumption of current CF6-50 turbofan engines for wide bodied commercial aircraft. The program performance improvement goal of 0.3% delta sfc was determined to be achievable with an improved impingement cooling system. The technology enables the design of an optimized manifold and piping system which is capable of a performance gain of 0.45% delta sfc. E.A.K.

N82-33394*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
ENERGY EFFICIENT ENGINE: TURBINE TRANSITION DUCT MODEL TECHNOLOGY REPORT
K. Leach and R. Thurlin Aug. 1982 113 p refs
(Contract NAS3-20646)
(NASA-CR-167996; NAS 1.26:167996; PWA-5594-215) Avail: NTIS HC A06/MF A01 CSCL 21E

The Low-Pressure Turbine Transition Duct Model Technology Program was directed toward substantiating the aerodynamic definition of a turbine transition duct for the Energy Efficient Engine. This effort was successful in demonstrating an aerodynamically viable compact duct geometry and the performance benefits associated with a low camber low-pressure turbine inlet guide vane. The transition duct design for the flight propulsion system was tested and the pressure loss goal of 0.7 percent was verified. Also, strut fairing pressure distributions, as well as wall pressure coefficients, were in close agreement with analytical predictions. Duct modifications for the integrated core/low spool were also evaluated. The total pressure loss was 1.59 percent. Although the increase in exit area in this design produced higher wall loadings, reflecting a more aggressive aerodynamic design, pressure profiles showed no evidence of flow separation. Overall, the results acquired have provided pertinent design and diagnostic information for the design of a turbine transition duct for both the flight propulsion system and the integrated core/low spool. J.M.S.

N82-33395# Garrett Turbine Engine Co., Phoenix, Ariz.
CERAMIC GAS TURBINE ENGINE DEMONSTRATION PROGRAM Final Report, 2 Jan. 1976 - 31 May 1981
May 1982 125 p refs

(Contract N00024-76-C-5352; DARPA Order 3155)
(AD-A117088; Rept-21-4410) Avail: NTIS HC A06/MF A01 CSCL 21/5

Ceramics, because of their stability at high temperature, have the potential to improve the power and fuel efficiency of gas turbine engines by allowing engine operation at higher temperature with minimum cooling penalty. The DARPA/NAVY/Garrett Ceramic Gas Turbine Engine Demonstration Program was begun in 1976 with the objective of demonstrating that ceramics could be designed, fabricated, and built into a gas turbine engine and that the engine could be operated with higher power and lower specific fuel consumption than a baseline metallic engine. Extensive design, ceramic component processing development, material property evaluation, proof testing, nondestructive evaluation development, and rig and engine testing were conducted. An engine containing first-stage ceramic rotor blades (with the other components metallic) was successfully operated at design speed (41,730 rpm) and at an average turbine inlet temperature of 2200 F under severe cyclic conditions for 15 hours. An engine containing a ceramic hot section consisting of two full turbine stages (102 separate ceramic parts) was successfully operated in single cycles at design speed and at 2200 F producing 30 percent greater power and consuming 7 percent less fuel than the baseline metallic engine. Cyclic testing of the all-ceramic hot section was not successful because of a contact stress problem that would have required engine redesign. GRA

N82-33396# Tennessee Univ. Space Inst., Tullahoma.
NUMERICAL STABILITY ANALYSIS OF A COMPRESSOR MODEL Final Report, 1 Sep. 1980 - 1 Dec. 1981
K. C. Reddy and Yeng-Yung Tsui Arnold Air Force Station, Tenn. AEDC Jul. 1982 67 p refs
(Contract F40600-80-C-0006)
(AD-A116878; AEDC-TR-82-16; UTSI-82-5) Avail: NTIS HC A03/MF A01 CSCL 21/5

Various numerical schemes for solving the equations of a compressor model are analyzed. Runge-Kutta scheme, JRS scheme and MacCormack scheme have been studied. Proper imposition of the boundary conditions has been found to be critical for the numerical stability of these schemes. An accurate method of prescribing the boundary conditions by the use of characteristics has been developed. With this method of boundary conditions numerically stable results have been obtained for different test cases by all three numerical schemes. Author (GRA)

N82-33397# New Jersey Inst. of Tech., Newark. Dept. of Chemical Engineering.
PREDICTIVE MODEL FOR JET ENGINE TEST CELL OPACITY Final Report, 1 Jul. 1980 - 30 Sep. 1981
Gordon A. Lewandowski Tyndall AFB, Fla. AFESC 30 Sep. 1981 74 p refs
(Contract F08635-80-C-0222; AF Proj. 1900)
(AD-A117585; AFESC/ESL-TR-81-46) Avail: NTIS HC A04/MF A01 CSCL 09/2

A computer program (written in FORTRAN for a CDC 6600) was developed to predict the plume opacity of jet engine test cells. The data input required for the model includes: the particle density, concentration, and size distribution in the exhaust gas, and the effective stack diameter. Previous data obtained for j-57 engines were used to test the model, and the difference between the theoretical and measured transmittance was generally within one percent. The program also predicts the theoretical effect of using electrostatic precipitators or venturi scrubbers to treat the exhaust emissions. These predictions indicate that control devices larger than the test cells would have to be installed to even achieve a minimal effect on the observed visibility. Author (GRA)

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-33398*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A GROUND-SIMULATOR INVESTIGATION OF HELICOPTER LONGITUDINAL FLYING QUALITIES FOR INSTRUMENT APPROACH
J. V. Lebacqz, R. D. Forrest (FAA, Moffett Field, Calif.), and R. M. Gerdes Sep. 1982 91 p refs
(NASA-TM-84225; A-8983; NAS 1.15:84225) Avail: NTIS HC A05/MF A01 CSCL 01C

A ground-simulation experiment was conducted to investigate the direct and interactive influences of several longitudinal static and dynamic stability parameters on helicopter flying qualities during terminal-area operations in instrument conditions. Variations that were examined included five levels of static control-position gradients ranging from stable to unstable; two levels of dynamic stability for the long-period oscillation; two levels of the steady-state pitch speed gradient; two levels of angle-of-attack stability and pitch-rate damping; and two levels of stability and control augmentation. These variations were examined initially in calm air and thin in simulated light-to-moderate turbulence and wind shear. Five pilots performed a total of 223 evaluations of these parameters for a representative microwave landing system precision approach task conducted in a dual-pilot crew-loading situation. Author

N82-33399*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
STUDY OF AN AUTOMATIC TRAJECTORY FOLLOWING CONTROL SYSTEM Final Report
H. F. VanLandingham, Richard L. Moose, Philip E. Zwicke, William H. Lucas, and Joel D. Brinkley 31 Aug. 1982 87 p refs
(Grant NsG-1354)
(NASA-CR-169361; NAS 1.26:169361) Avail: NTIS HC A05/MF A01 CSCL 01C

The estimator part of the Modified Partitioned Adaptive Controller, MPAC, developed for the nonlinear B737 is shown to be adaptable to sensor failures. An investigation is made into the potential usefulness of the configuration detection technique used in the MPAC and the failure detection filter technique developed for detecting actuator and sensor failures for a linearized model with significant modeling errors such as the B737 model. A synopsis of the design procedure for failure detection filters is given and a decision technique for the failure detection filter is developed that determines how a noise plant output is associated with a line or plane characteristic of a failure. It is shown by computer simulation that the estimator part and the configuration detection part of the MPAC can readily adapt to actuator and sensor failures and that the failure detection filter technique cannot detect actuator or sensor failures accurately for this type of system because of the plant modeling errors. In addition it is shown that the decision technique developed for the failure detection filter can accurately determine the plant output is related to the characteristic line or plane in the presence of sensor noise. Author

N82-33400*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
ANALYSIS OF SEVERAL GLIDEPATH AND SPEED CONTROL AUTOPILOT CONCEPTS FOR A POWERED LIFT STOL AIRCRAFT
W. S. Hindson Aug. 1982 58 p refs
(NASA-TM-84282; A-9005; NAS 1.15:84282) Avail: NTIS HC A04/MF A01 CSCL 01C

Longitudinal performance and control utilization data are compared for several different automatic approach autopilot implementations in a powered lift STOL aircraft. As few as two, to as many as four laws reflecting both backside and frontside control techniques. The data are developed from analysis and

simulation, but represent configurations which were demonstrated in flight. Transient response characteristics from initial glidepath offsets are presented, along with system operation in turbulence. In furnishing quantitative data in controlled levels of simulated turbulence, these results provide a useful supplement to various flight investigations (including those employing manual control) that involved a comparison of control techniques in this type of aircraft. S.L.

N82-33401# Dynamic Controls, Inc., Dayton, Ohio.
FLIGHT TESTS OF A GE AND DCI DIRECT DRIVE FLY BY WIRE FLIGHT CONTROL SYSTEM Final Report, Oct. 1978 - Apr. 1981
Wright-Patterson AFB, Ohio AFWAL Jun. 1982 108 p refs
(Contract F33615-78-C-3609; AF Proj. 1987)
(AD-A117244; AFWAL-TR-82-3035) Avail: NTIS HC A06/MF A01 CSCL 01/3

This report describes the flight test of two Fly-By-Wire flight control systems which use direct drive control valves. The test aircraft is an F-4E and the test systems are used to control the left aileron of the test aircraft. One test system was developed by the General Electric Company and the other by Dynamic Controls, Inc. The report describes the test systems, the aircraft installation, flight test and results. Author (GRA)

N82-33402# Michigan Technological Univ., Houghton. Dept. of Aerospace Engineering.
SYSTEM OPTIMIZATION BY PERIODIC CONTROL Final Report, 1 Oct. 1976 - 31 Jan. 1982
Elmer G. Gilbert 31 Mar. 1982 30 p refs
(Grant AF-AFOSR-3158-77; AF Proj. 2304)
(AD-A117815; AFOSR-82-0575TR) Avail: NTIS HC A03/MF A01 CSCL 01/3

Research results obtained under the grant are summarized. Contributions to periodic control include: theory, computational methods and applications to aircraft cruise. The theory centers around necessary or sufficient conditions for optimality and gives information on whether or not periodic operation of a dynamic system gives better performance than steady-state operation. The treatment is comprehensive and includes new second-order conditions which have simplified assumptions and incorporate control constraints. Some of these results follow from a new approach to the derivation of higher-order necessary conditions. The approach does not require normality assumptions and has provided other new results, including second-order necessary conditions in optimal control. A method for computing periodic optima is described. It addresses difficulties observed in other approaches and has proved effective in example problems. Optimal aircraft cruise (specific range, endurance, peak altitude) was studied as an application of theoretical and computational techniques. Under special circumstances (e.g., altitude constraints, in low wing loading and drag, high thrust limits), it appears that periodic cruise is significantly better than steady-state cruise. Some research was also done on the theory of nonlinear systems. It includes: functional expansions for input-output maps, conditions for realizability, a backward shift approach to internally bilinear realizations and canonical forms for minimal-order realizations of two-power input-output maps. Author (GRA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-33403# Comptroller General of the United States, Washington, D.C.
EXAMINATION OF THE FEDERAL AVIATION ADMINISTRATION'S PLAN FOR THE NATIONAL AIRSPACE SYSTEM Interim Report
General Accounting Office 20 Apr. 1982 64 p refs
(AFMD-82-66; B-206887) Avail: NTIS HC A04/MF A01

Resolution of issues involving budget, computer acquisition, landing systems, collision avoidance, and communications systems concerning a plan for a national airspace system is discussed. N.W.

N82-33404*# General Electric Co., Schenectady, N. Y.
DESIGN CONCEPTS AND COST STUDIES FOR MAGNETIC SUSPENSION AND BALANCE SYSTEMS Final Report, Nov. 1980 - Mar. 1981
H. L. Bloom Jul. 1982 347 p refs Prepared for Kentron International, Inc., Hampton, Va.
(Contract NAS1-16000)
(NASA-CR-165917; NAS 1.26:165917; Rept-81LSP47251) Avail: NTIS HC A15/MF A01 CSCL 14B

The application of superconducting magnets for suspension and balance of wind tunnel models was studied. Conceptual designs are presented for magnetic suspension and balance system (MSBS) configurations compatible with three high Reynolds number cases representing specified combinations of test conditions and model sizes. Concepts in general met initially specified performance requirements such as duty cycle, force and moment levels, model angular displacement and positioning accuracy with nominal design requirements for support subsystems. Other performance requirements, such as forced model sinusoidal oscillations, and control force magnitude and frequency, were modified so as to alleviate the magnitude of magnet, power, and cryogenic design requirements. Author

N82-33405*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CRYOGENIC WIND TUNNELS: A SELECTED, ANNOTATED BIBLIOGRAPHY
Marie H. Tuttle and Robert A. Kilgore Sep. 1982 62 p Supersedes NASA-TM-80168 and NASA-TM-80168-Suppl-1
(NASA-TM-84474; L-15335; NAS 1.15:84474) Avail: NTIS HC A04/MF A01 CSCL 14B

There are 277 entries, 110 of which were added in this updated version. Selection for inclusion was made with consideration of usefulness to persons interested in building or using a cryogenic wind tunnel. S.L.

N82-33406# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DEVICE FOR THE CONTROL OF FREE-SPINNING MODELS IN A WIND TUNNEL
L. F. Teplov, A. S. Kryukov, and M. M. Mikhaylov 24 May 1982 8 p Transl. into ENGLISH of Russian Patent No. 178176 (5 Aug. 1970) 4 p
(AD-A115993; FTD-ID(RS)T-0588-82) Avail: NTIS HC A02/MF A01 CSCL 14/2

A device for the program control of free-spinning models in the experimental study of the spin in a vertical wind tunnel is described. It consists of a panel for controlling and monitoring the model through a radio channel formed by a stationary transmitter, an inductive antenna located around the working section of the tunnel, a receiver, actuating mechanisms, connected with control vanes of the model, and sensors [pickups] mounted on the model. The purpose of the device is to eliminates problems caused by the uncoupling of the model from suspensions in the course of the experiment and the location of the antennas of the radio channel along the circumference of the tunnel. GRA

N82-33407# Naval Training Equipment Center, Orlando, Fla. Advanced Simulation Concepts Lab.
MATH MODEL DESCRIPTION FOR THE VISUAL TECHNOLOGY RESEARCH SIMULATOR (VTRS) CONVENTIONAL TAKEOFF AND LANDING (CTOL) WEAPON DELIVERY VISUAL SYSTEM Final Technical Report
Edward M. Holler Jan. 1982 134 p

(AD-A117141; NAVTRAEQUIPC-IH-335) Avail: NTIS HC A07/MF A01 CSCL 12/1

This report provides a technical description of the software for weapon delivery simulation for the T-2C aircraft at the Visual Technology Research Simulator (VTRS) facility. A summary of the complete system is provided and each of the software modules is described in detail. System flow charts, axis system diagrams, math model vector diagrams, and logic tables are provided. The mathematical equations are done in FORTRAN. Pictures of visual scenes and moving models are also provided to illustrate system capability. Author (GRA)

N82-33408# Oak Ridge National Lab., Tenn.
TESTING OF TRITIUM-POWERED RUNWAY DISTANCE AND TAXIWAY MARKERS Final Report, Oct. 1980 - May 1981
K. W. Haff, F. N. Case, J. A. Tompkins, and F. J. Schultz Tyndall AFB, Fla. Air Force Engineering and Services Center Aug. 1981 28 p refs Sponsored by AF
(AD-A114558; AFESC/ESL-TR-81-45) Avail: NTIS HC A03/MF A01 CSCL 01/5

The Isotope Technology Group of the Oak Ridge National Laboratory's Radioisotopes Department was asked by the U.S. Air Force to test tritium-powered runway distance and taxiway marker signs. The tests were selected by mutual agreement of the U.S. Air Force and Oak Ridge National Laboratory and were designed to test the serviceability of these signs under adverse weather and handling conditions, determine their limiting factors, and determine their service life. The testing program results indicate that the signs will exceed strength and durability requirements for their intended purpose. This report is a discussion of the testing program and the results of those tests. Author (GRA)

N82-33409# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
NUMERICAL SOLUTION OF AN ILL-POSED PROBLEM ARISING IN WIND TUNNEL HEAT TRANSFER DATA REDUCTION
John B. Bell and Andrew B. Wardlaw, Jr. 4 Dec. 1981 37 p refs
(AD-A117572; AD-F500046; NSWC/TR-82-32) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report documents a computer program which solves an improperly posed heat conduction problem arising in the measurement of heat transfer data in wind tunnel experiments. The mathematical model which is treated is one dimensional and assumes constant material properties. The computational approach is based on an adaptation of a method used by Alifanov to treat a similar problem. The Green's function for a well posed heat conduction problem is used to reduce the problem to a Volterra integral equation of the first kind. Tikhonov regularization techniques are then applied to compute stable approximate solutions. Numerical results for several cases typical of a class of wind tunnel experiments are presented. GRA

N82-33410# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CHINA'S NEWLY DESIGNED AND BUILT AIRCRAFT ENGINE TEST STAND
29 Jun. 1982 9 p Transl. into ENGLISH from Guoji Hangkong (China), no. 4, Apr. 1980 p 19-21
(AD-A117569; FTD-ID(RS)T-1448-81) Avail: NTIS HC A02/MF A01 CSCL 14/2

China's Newly Designed and Built Aircraft Engine Test Stand was evaluated. New technology was employed in the design. This included three dimensional structures which employ construction methods of entirely reinforced concrete, and a change to a reinforced concrete frame method. E.A.K.

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-33411*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SPACELAB MISSION 2: EXPERIMENTAL DESCRIPTIONS
K. Stuart Clifton, ed. Jan. 1982 64 p refs
(NASA-TM-82477; NAS 1.15:82477) Avail: NTIS HC A04/MF A01 CSCL 22A

The second Spacelab Mission and the 12 multidisciplineary experiments selected to fly on board are described. These experiments include the following: vitamin D metabolities and bone demineralization; interaction of oxygen and gravity influenced lignification; ejectable plasma diagnostics package; plasma depletion experiments for ionospheric and radio astronomical studies; small helium cooled IR telescope; elemental composition and energy spectra of cosmic ray nuclei; hard X-ray imaging of clusters of galaxies and other extended X-ray sources; solar magnetic and velocity field measurement system; solar coronal helium abundance Spacelab experiment; solar UV high resolution telescope and spectroraph; solar UV spectral irradiance monitor; and properties of superfluid helium in zero-G. Author

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

No abstracts in this category.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-33412# Committee on Energy and Commerce (U. S. House).
SATELLITE COMMUNICATIONS/DIRECT BROADCAST SATELLITES
Washington GPO 1982 371 p refs Hearing before the Subcomm. on Telecommun., Consumer Protect., and Finance of the Comm. on Energy and Com., 97th Congr., 1st Sess., 15 Dec. 1981
(GPO-90-289) Avail: Subcommittee on Telecommunications, Consumer Protection, and Finance

The authorization of a satellite system, direct broadcasting satellites; the overall regulation of domestic satellites; and the proposal to reduce orbital spacing to 2 deg are discussed. These issues are examined in relation to the encouragement of competition, promotion of diversity of information systems, and deregulation where it is warranted by the level of competition. S.L.

N82-33413*# National Aeronautics and Space Administration, Washington, D. C.
INTELSAT V-E(F-5)
22 Sep. 1982 21 p refs

(NASA-TM-84857; M-491-203-82-05; NAS 1.15:84857) Avail: NTIS HC A02/MF A01 CSCL 22B

Prelaunch mission plans for the INTELSAT V-5 (F-5) commercial communications satellites are summarized. Voice circuits, television channels, and a Maritime Communications Services package for the Maritime Satellite Organization (INMARSAT) to provide ship/shore/ship communications are described. N.W.

N82-33414# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

DICTIONARY OF MISSILE AND ARTILLERY TERMS

A. P. Bogatskiy, F. S. Kuznetsov, and A. F. Shapovalov 20 May 1982 283 p refs Transl. into ENGLISH from the mono. "Slovar Raketnykh i Artilleriyskikh Terminov" Moscow, Voyennoye Publishing House, 1968 p 1-31 and 32-64

(AD-A115995; FTD-ID(RS)T-1988-80) Avail: NTIS HC A13/MF A01 CSCL 05/2

A missile and artillery dictionary with explanation of terms, concepts, and words is presented. This work provides a collection of missile and artillery terms and their brief definition. The dictionary encompasses all branches of artillery science: material, ammunition, igniters, fuses, instruments, firing, and others. GRA

N82-33415# Naval Surface Weapons Center, White Oak, Md.

AN INVISCID COMPUTATIONAL METHOD FOR TACTICAL MISSILE CONFIGURATIONS

A. B. Wardlaw, Jr., F. P. Baltakis, J. M. Solomon, and L. B. Hackerman 1 Dec. 1981 117 p refs

(AD-A116904; AD-F500038; NSWC-TR-457) Avail: NTIS HC A06/MF A01 CSCL 16/4

A finite difference method suitable for the design of finned bodies in supersonic flight is described. Efficient numerical calculations are achieved using a thin fin approximation which neglects fin thickness but retains a description of the fin surface slope. The resulting algorithm is suitable for treating relatively thin, straight fins with sharp edges which may be deflected. Methods for treating the fin leading and trailing edges are described which are dependent on the Mach number of the flow normal to the leading edge. The leading and trailing edge analysis varies from exact to empirical as the normal component varies from a supersonic to subsonic. A procedure for modeling body crossflow separation using a Kutta condition is described which yields a reasonable leeside vortex structure. Calculations are compared to experiment for body-alone, body-wing, body-tail and body-wing-tail configurations. The computer program, developed in this study, is described in a separate report. GRA

N82-33416# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.

EFFECT OF SATELLITE ORBIT ERROR ON COMPUTED COORDINATES OF DOPPLER RECEIVERS Final Report

Richard J. Anderle Apr. 1982 82 p refs

(AD-A116894; NSWC/TR-82-143) Avail: NTIS HC A05/MF A01 CSCL 22/3

Positions of stations making Doppler observations of Navy Navigation Satellites are computed using predicted ephemerides broadcast by the satellites or using precise ephemerides computed in post analysis of data. When the broadcast ephemeris is used, it is customary to include a model of the ephemeris error in station position computations. Consideration of the ephemeris error, which can vary from pass to pass, is expected to improve the accuracy of station positions, particulary when the satellite is in view of two or more stations simultaneously. In contrast, precise ephemerides were originally used in 1963 to determine the positions of isolated sites. Although computations are currently performed for sites in close proximity, a systematic study has never been conducted to determine whether consideration of the error in the precise ephemeris would improve the accuracy of computations. This report compares the consistency of solutions for the relative locations of sites for various models of the error in the precise ephemeris. GRA

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N82-33417*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

ATMOSPHERIC CONSTRAINT STATISTICS FOR THE SPACE SHUTTLE MISSION PLANNING

O. E. Smith, G. W. Batts (Computer Sciences Corp., Huntsville, Ala.), and J. A. Willett (Computer Sciences Corp., Huntsville, Ala.) Aug. 1982 39 p refs

(NASA-TP-2069; NAS 1.60:2069) Avail: NTIS HC A03/MF A01 CSCL 22A

The procedures used to establish statistics of atmospheric constraints of interest to the Space Shuttle mission planning are presented. The statistics considered are for the frequency of occurrence, runs, and time conditional probabilities of several atmospheric constrants for each of the Space Shuttle mission phases. The mission phases considered are (1) prelaunch, (2) launch, (3) return to launch site, (4) abort once around landing, and (5) end of mission landing. Author

N82-33418# Committee on Science and Technology (U. S. House).

THE NEED FOR A FIFTH SPACE SHUTTLE ORBITER

Washington GPO 1982 155 p refs Hearing before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 2d Sess., No. 105, 15 Jun. 1982

(GPO-96-894) Avail: Subcommittee on Space Science and Applications

The requirements for increasing the size of the Space Shuttle orbiter fleet are considered. Private sector acquisition of the fifth orbiter vehicle is also considered. N.W.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-33419*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

MECHANICAL FASTENER Patent Application

Albert B. Stacy, Jr., inventor (to NASA) Filed 25 Jun. 1982 14 p (NASA-Case-LAR-12738-1; US-Patent-Appl-SN-392095) Avail: NTIS HC A02/MF A01 CSCL 22B

A mechanical means of fastening a temporary replacement heat shield tile to the strain isolate pad of a space vehicle while the vehicle is in outer space is described. A flanged aluminum sleeve and an internally threaded, flanged, stainless steel cylinder

are used. The flanged portion of the stainless steel cylinder consists of four 'L' shaped blades. Before using the assembled device, it is adhesively attached to a predrilled replacement heat shield tile. In using the device to attach the heat shield tile to the strain isolation pad, the brass plug and the stainless steel cylinder are rotated with respect to each other until the flanged portion of the stainless steel cylinder rests against the strain isolation pad and the brass plug is not in contract with the aluminum sleeve. The brass plug and the stainless steel cylinder are then simultaneously rotated with respect to the aluminum sleeve so that the 'L' shaped blades of the stainless steel cylinder grasp the strain isolation pad and fasten the heat shield tile. The brass plug is then rotated with respect to the stainless steel cylinder to draw the heat shield tile snug against the strain isolation pad and complete the connection. NASA

N82-33420*# Itek Corp., Lexington, Mass. Optical Systems.
FEASIBILITY EVALUATION AND STUDY OF ADAPTING THE ATTITUDE REFERENCE SYSTEM TO THE ORBITER CAMERA PAYLOAD SYSTEM'S LARGE FORMAT CAMERA Final Report
31 Mar. 1982 165 p refs
(Contract NAS9-16562)
(NASA-CR-167629; NAS 1.26:167629; Itek-82-8466.1) Avail: NTIS HC A07/MF A01 CSCL 22B

A design concept that will implement a mapping capability for the Orbital Camera Payload System (OCPS) when ground control points are not available is discussed. Through the use of stellar imagery collected by a pair of cameras whose optical axis are structurally related to the large format camera optical axis, such pointing information is made available. Author

N82-33421*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ILLUMINATION FROM SPACE WITH ORBITING SOLAR-REFLECTOR SPACECRAFT
John E. Canady, Jr. and John L. Allen, Jr. Sep. 1982 90 p refs
(NASA-TP-2065; L-15127; NAS 1.60:2065) Avail: NTIS HC A05/MF A01 CSCL 22B

The feasibility of using orbiting mirrors to reflect sunlight to Earth for several illumination applications is studied. A constellation of sixteen 1 km solar reflector spacecraft in geosynchronous orbit can illuminate a region 333 km in diameter to 8 lux, which is brighter than most existing expressway lighting systems. This constellation can serve one region all night long or can provide illumination during mornings and evenings to five regions across the United States. Preliminary cost estimates indicate such an endeavor is economically feasible. The studies also explain how two solar reflectors can illuminate the in-orbit nighttime operations of Space Shuttle. An unfurlable, 1 km diameter solar reflector spacecraft design concept was derived. This spacecraft can be packaged in the Space, Shuttle, transported to low Earth orbit, unfurled, and solar sailed to operational orbits up to geosynchronous. The necessary technical studies and improvements in technology are described, and potential environmental concerns are discussed. S.L.

N82-33422*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
ATTITUDE AND VIBRATION CONTROL OF A LARGE FLEXIBLE SPACE-BASED ANTENNA Progress Report, period ending 14 Aug. 1982
S. M. Joshi and G. L. Goglia Sep. 1982 33 p refs
(Grant NAG1-102)
(NASA-CR-169419; NAS 1.26:169419) Avail: NTIS HC A03/MF A01 CSCL 22B

The problem of control systems synthesis is considered for controlling the rigid body attitude and elastic motion of a large deployable space based antenna. Two methods for control systems synthesis are considered. The first method utilizes the stability and robustness properties of the controller consisting of torque actuators and collocated attitude and rate sensors. The second method is based on the linear quadratic Gaussian (LQG) control theory. A combination of the two methods, which results in a two level hierarchical control system, is also briefly discussed. The performance of the controllers is analyzed by computing the variances of pointing errors, feed misalignment errors and surface contour errors in the presence of sensor and actuator noise. Author

N82-33423*# Howard Univ., Washington, D. C. Dept. Of Mechanical Engineering.
THE DYNAMICS AND CONTROL OF LARGE FLEXIBLE SPACE STRUCTURES-V Final Report
Peter M. Bainum, A. S. S. R. Reddy, Cheick M. Diarra, and V. K. Kumar Aug. 1982 83 p refs
(Contract NsG-1414)
(NASA-CR-169360; NAS 1.26:169360) Avail: NTIS HC A05/MF A01 CSCL 22B

A general survey of the progress made in the areas of mathematical modelling of the system dynamics, structural analysis, development of control algorithms, and simulation of environmental disturbances is presented. The use of graph theory techniques is employed to examine the effects of inherent damping associated with LSST systems on the number and locations of the required control actuators. A mathematical model of the forces and moments induced on a flexible orbiting beam due to solar radiation pressure is developed and typical steady state open loop responses obtained for the case when rotations and vibrations are limited to occur within the orbit plane. A preliminary controls analysis based on a truncated (13 mode) finite element model of the 122m. Hoop/Column antenna indicates that a minimum of six appropriately placed actuators is required for controllability. An algorithm to evaluate the coefficients which describe coupling between the rigid rotational and flexible modes and also intramodal coupling was developed and numerical evaluation based on the finite element model of Hoop/Column system is currently in progress. Author

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-33424*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
INTEGRATED PROPULSION FOR NEAR-EARTH SPACE MISSIONS. VOLUME 1: EXECUTIVE SUMMARY Final Report, 29 Sep. 1980 - 29 Sep. 1981
C. L. Dailey, H. F. Meissinger, R. H. Lovberg, and S. Zafran Oct. 1981 27 p refs
(Contract NAS3-22661)
(NASA-CR-167889-Vol-1; NAS 1.26:167889-Vol-1; TRW-37255-6001-UT-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 21C

Tradeoffs between electric propulsion system mass ratio and transfer time from LEO to GEO were conducted parametrically for various thruster efficiency, specific impulse, and other propulsion parameters. A computer model was developed for performing orbit transfer calculations which included the effects of aerodynamic drag, radiation degradation, and occultation. The tradeoff results

showed that thruster technology areas for integrated propulsion should be directed towards improving primary thruster efficiency in the range from 1500 to 2500 seconds, and be continued towards reducing specific mass. Comparison of auxiliary propulsion systems showed large total propellant mass savings with integrated electric auxiliary propulsion. Stationkeeping is the most demanding on orbit propulsion requirement. At area densities above 0.5 sq m/kg, East-West stationkeeping requirements from solar pressure exceed North-South stationkeeping requirements from gravitational forces. A solar array pointing strategy was developed to minimize the effects of atmospheric drag at low altitude, enabling electric propulsion to initiate orbit transfer at Shuttle's maximum cargo carrying altitude. Gravity gradient torques are used during ascent to sustain the spacecraft roll motion required for optimum solar array illumination. A near optimum cover glass thickness of 6 mils was established for LEO to GEO transfer. Author

N82-33425*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
INTEGRATED PROPULSION FOR NEAR-EARTH SPACE MISSIONS. VOLUME 2: TECHNICAL Final Report, 29 Sep. 1980 - 29 Sep. 1981
C. L. Dailey, H. F. Meissinger, R. H. Lovberg, and S. Zafran Oct. 1981 173 p refs
(Contract NAS3-22661)
(NASA-CR-167889-Vol-2; NAS 1.26:167889-Vol-2; TRW-37255-6002-UT-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 21C

The calculation approach is described for parametric analysis of candidate electric propulsion systems employed in LEO to GEO missions. Occultation relations, atmospheric density effects, and natural radiation effects are presented. A solar cell cover glass tradeoff is performed to determine optimum glass thickness. Solar array and spacecraft pointing strategies are described for low altitude flight and for optimum array illumination during ascent. Mass ratio tradeoffs versus transfer time provide direction for thruster technology improvements. Integrated electric propulsion analysis is performed for orbit boosting, inclination change, attitude control, stationkeeping, repositioning, and disposal functions as well as power sharing with payload on orbit. Comparison with chemical auxiliary propulsion is made to quantify the advantages of integrated propulsion in terms of weight savings and concomittant launch cost savings. Author

N82-33426# Ogden Air Logistics Center, Hill AFB, Utah. Propellant Analysis Lab.
SURVEILLANCE REPORT. STAGE 1: DISSECTED MOTORS. PHASE 13: PROPELLANT AND COMPONENT TESTING Semiannual Report
John A. Thompson May 1982 119 p
(AD-A117604; MANPA-NR-470(82)) Avail: NTIS HC A06/MF A01 CSCL 21/9

Testing was performed to determine the useful shelf/service life for LGM-30 Stage I Rocket Motors. A three year storage program for propellant and components was started in May 1961. This program was then extended to a ten year study and later continued indefinitely to assure that a deterioration in motor physical characteristics could be detected in time to take some corrective actions before the weapon system performance deteriorated below an acceptable level. This report covers only propellant data and limited case bond data. The malfunction of an environmental chamber destroyed component samples that had originally been part of this testing program (and the inadvertent burning of some motors during dissection reduced the material available for testing). Planned dissection of selected motors in the future will provide samples for continued component testing. Test specimens for this reporting period were obtained from motors STM-012, 0012099, and 0012199. UP-7775 block propellant was not tested since that propellant has been used up. GRA

N82-33427# Failure Analysis Associates, Palo Alto, Calif.
PROBABILISTIC ENVIRONMENTAL MODEL FOR SOLID ROCKET MOTOR LIFE PREDICTION
George Derbalian, Jerrell M. Thomas, Paul Johnston, and Gregg Brooks China Lake, Calif. Naval Weapons Center Mar. 1982 222 p refs
(Contract N60530-78-C-0127; WF31300000)
(AD-A117651; NWC-TP-6305) Avail: NTIS HC A10/MF A01 CSCL 21/8

Temperature changes that solid rocket motors experience while residing in various locations with different climates cause thermal stresses in the propellant. Repeated application of such stresses can cause damage to the rocket propellant, which may result in cracks. This report describes a probabilistic environmental model for solid rocket motors. Movement of rockets from one station to an other is simulated, using a Markov chain technique. A cumulative damage model is used to compile the damage resulting in each rocket location. The rocket external temperature is assumed to be a random variable and expressed in a probabilistic form for each Markov state. As an example, data were collected to represent the environmental model for Sidewinder rockets. The Markov matrix for Sidewinders was based on past motor logistics. Propellant failure is predicted when the cumulative damage exceeds a critical value. Author (GRA)

N82-33428# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
AUGMENTOR STABILITY MANAGEMENT PROGRAM Final Report, 1 Sep. 1979 - 30 Sep. 1981
R. Ernst Wright-Patterson AFB, Ohio AFWAL Feb. 1982 118 p refs
(Contract F33615-79-C-2059; AF Proj. 3066)
(AD-A117926; PWA-FR-15477; AFWAL-TR-82-2001) Avail: NTIS HC A06/MF A01 CSCL 21/8

A model has been developed which predicts the efficiency and low frequency stability of a turbofan augmentor. The model evaluates the stability characteristics of the flameholders at low inlet temperature with a model for two-phase fuel flames. The driving potential for low frequency instability is identified with excessive flameholder wake fuel-air ratio. The model is compared to engine experience, available literature and other models with favorable results. Author (GRA)

N82-33429# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE ANALYSIS FOR REGULATION PERFORMANCE OF A VARIABLE THRUST ROCKET ENGINE CONTROL SYSTEM
Zhou Xiwen 29 Sep. 1982 27 p refs Transl. into ENGLISH from Yuhang Xuebao (China), no. 1, 1982 p 18-29
(AD-A117495; FTD-ID(RS)T-0522-82) Avail: NTIS HC A03/MF A01 CSCL 21/9

The constituent, operation principle and regulation process of the bipropellant variable thrust rocket engine for a variable area injector that uses a solenoid valve control are introduced. The mathematical models for the main links are given, by transfer function method according to the constituent and practical operation process of such an engine control system. The dynamic and steady-state performance is analyzed, according to the calculation results, and the effect on dynamic performance and steady error for the engine control system is further described. GRA

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-33430*# Alabama Univ., Huntsville.
CONTAINERLESS PROCESSING TECHNOLOGY ANALYSIS Final Report, 8 May 1980 - 31 Aug. 1982
J. E. Rush 8 Sep. 1982 53 p refs
(Contract NAS8-33731)
(NASA-CR-170624; NAS 1.26:170624) Avail: NTIS HC A04/MF A01 CSCL 07D

Research on acoustic levitation, air-jet levitation, and heat transfer from molten samples is reported. The goal was to obtain a better understanding and improving the quality of containerless processing systems. These systems are applied to the processing of materials in situations in which contact with a container must be avoided, and have potential application in both ground based and orbiting laboratories. Containerless processing is reviewed. The development of glasses from materials which normally crystallize upon cooling, are studied. E.A.K.

24 COMPOSITE MATERIALS

Includes laminates.

N82-33431*# Hughes Aircraft Co., Culver City, Calif.
APPLICATION OF IN SITU FIBERIZATION FOR FABRICATION OF IMPROVED STRAIN ISOLATION PADS AND GRAPHITE EPOXY COMPOSITES Final Report
R. W. Rosser, R. W. Seibold, and D. I. Basiulis Washington NASA Sep. 1982 125 p refs
(Contract NAS1-16437)
(NASA-CR-3616; NAS 1.26:3616; Rept-76-21-13) Avail: NTIS HC A06/MF A01 CSCL 11D

The feasibility of applying the in situ fiberization process to the fabrication of strain isolation pads (SIP) for the Space Shuttle and to the fabrication of graphite-epoxy composites was evaluated. The ISF process involves the formation of interconnected polymer fiber networks by agitation of dilute polymer solutions under controlled conditions. High temperature polymers suitable for SIP use were fiberized and a successful fiberization of polychloro trifluoroethylene, a relatively high melting polymer, was achieved. Attempts to fiberize polymers with greater thermal stability were unsuccessful, apparently due to characteristics caused by the presence of aromaticity in the backbone of such materials. Graphite-epoxy composites were fabricated by interconnecting two dimensional arrays of graphite fiber with polypropylene IS fibers with subsequent epoxy resin impregnation. Mechanical property tests were performed on laminated panels of this material to evaluate intralaminar and interlaminar shear strength, and thus fracture toughness. Test results were generally unpromising. J.D.

N82-33432*# General Dynamics/Convair, San Diego, Calif.
DEVELOPMENT OF TOUGH, MOISTURE RESISTANT LAMINATING RESINS Final Report
R. A. Brand and E. S. Harrison Washington NASA Sep. 1982 50 p refs
(Contract NAS1-15859)
(NASA-CR-3615; NAS 1.26:3614) Avail: NTIS HC A03/MF A01 CSCL 11D

Tough, moisture resistant laminating resins for employment with graphite fibers were developed. The new laminating resins exhibited cost, handleability and processing characteristics equivalent to 394K (250 F) curing epoxies. The laminating resins were based on bisphenol A dicyanate and monofunctional cyanates with hydrophobic substituents. These resins sorb only small quantities of moisture at equilibrium (0.5% or less) with minimal glass transition temperature depression and represent an improvement over epoxies which sorb around 2% moisture at equilibrium. Toughening was accomplished by the precipitation of small diameter particles of butadiene nitrile rubber throughout the resin matrix. The rubber domains act as microcrack termini and energy dissipation sites, allowing increased stress accommodation prior to catastrophic failure. A unique blend of amine terminated butadiene nitrile elastomer (MW 2,000) and a high nitrile content butadiene nitrile rubber yielded the desired resin morphology. S.L.

N82-33433*# National Aeronautics and Space Administration, Washington, D. C.
STRENGTH DIAGRAMS OF FIBROUS COMPOSITES WITH UNIDIRECTIONAL STRUCTURE
V. S. Ivanova and L. M. Ustinov Sep. 1982 10 p refs Transl. into ENGLISH from Izv. Akad. Nauk SSSR, Metally (USSR), no. 2, Mar. - Apr. 1970 p 176-180 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(NASA-TM-76975; NAS 1.15:76975) Avail: NTIS HC A02/MF A01 CSCL 11D

The dependence of the composite strength on the volume proportion of fiber and the transfer factor is analyzed. Four types of diagrams are constructed for the strength of composites as a function of the volume proportion of fibers and the transfer factor. Author

N82-33434*# Rensselaer Polytechnic Inst., Troy, N. Y. School of Engineering.
COMPOSITE STRUCTURAL MATERIALS Semiannual Progress Report, 30 Sep. 1981 - 30 Apr. 1982
George S. Ansell, Robert G. Loewy, and Stephen E. Wiberley Jul. 1982 309 p refs Sponsored in part by AFOSR
(Grant NGL-33-018-003)
(NASA-CR-169345; NAS 1.26:169345; SAR-42) Avail: NTIS HC A14/MF A01 CSCL 11D

Research in the basic composition, characteristics, and processng science of composite materials and their constituents is balanced against the mechanics, conceptual design, fabrication, and testing of generic structural elements typical of aerospace vehicles so as to encourage the discovery of unusual solutions to problems. Detailed descriptions of the progress achieved in the various component parts of his program are presented. S.L.

N82-33435*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
POSITRON ANNIHILATION SPECTROSCOPY WITH MAGNETICALLY ANALYZED BEAMS
Jag J. Singh, William H. Holt (Naval Surface Weapons Lab., Dahlgren, Va.), and Willis Mock, Jr. (Naval Surface Weapons Lab., Dahlgren, Va.) Aug. 1982 20 p refs
(NASA-TM-84535; NAS 1.15:84535) Avail: NTIS HC A02/MF A01 CSCL 11D

Lifetime measurements with magnetically analyzed positron beams were made in condensed media with uniform and non-uniform properties. As expected, the lifetime values with magnetically analyzed positron beams in uniform targets are similar to those obtained with conventional positron sources. The lifetime values with magnetically analyzed beams in targets which have non-uniform properties vary with positron energy and are different from the conventional positron source derived lifetime values in these targets. Author

N82-33436*# Advanced Research and Applications Corp., Sunnyvale, Calif.
STUDY OF FATIGUE DURABILITY OF ADVANCED COMPOSITE MATERIALS UNDER CONDITIONS OF ACCELERATED LOADING
Hsiuan-Ming Shih Oct. 1979 30 p refs
(Contract NAS2-10061)
(NASA-CR-166405; NAS 1.26:166405) Avail: NTIS HC A03/MF A01 CSCL 11D

The effect of temperature on the tension-tension fatigue life of the T300/5208 graphite/epoxy angle-ply laminate system was investigated in an effort to develop an acceptable and reliable method of accelerated loading. Typical S log sub 10 N curves were determined experimentally at 25 C, 75 C, and 115 C. The time-temperature superposition principle was employed to find the shift factors of uniaxial fatigue strength, and a general linear equation of S log sub 10 N for shifting purpose was established. The combined techniques of cyclic creep measurements and optical microscopy upon fatigue failure allow some assessment of the possible physical basis of S log 10 N curve shifting. Before fatigue, the laminates at all test temperatures and stress levels undergo a unique damage mechanism during fatigue loading. It is concluded that an accelerated loading method is feasible. S.L.

N82-33437*# Advanced Research and Applications Corp., Sunnyvale, Calif.

ACCELERATED FATIGUE DURABILITY OF A HIGH PERFORMANCE COMPOSITE Final Report
Assa Rotem Sep. 1982 32 p refs Presented at the ASTM Conf., San Francisco, 22-23 May 1979; presented as Fatigue behavior of graphite-epoxy laminates at elevated temperatures
(Contract NAS2-10228)
(NASA-CR-166407; NAS 1.26:166407) Avail: NTIS HC A03/MF A01 CSCL 11D

The fatigue behavior of multidirectional graphite-epoxy laminates was analyzed theoretically and experimentally in an effort to establish an accelerated testing methodology. Analysis of the failure mechanism in fatigue of the laminates led to the determination of the failure mode governing fracture. The nonlinear, cyclic-dependent shear modulus was used to calculate the changing stress field in the laminate during the fatigue loading. Fatigue tests were performed at three different temperatures: 25 C, 74 C, and 114 C. The prediction of the S-N curves was made based on the artificial static strength artificial static strength at a reference temperature and the fatigue functions associated with them. The prediction of an S-N curve at other temperatures was performed using shifting factors determined for the specific failure mode. For multidirectional laminates, different S-N curves at different temperatures could be predicted using these shifting factors. Different S-N curves at different temperatures occur only when the fatigue failure mode is matrix dominated. It was found that whenever the fatigue failure mode is fiber dominated, temperature, over the range investigated, had no influence on the fatigue life. These results permit the prediction of long-time, low temperature fatigue behavior from data obtained in short time, high temperature testing, for laminates governed by a matrix failure mode. Author

N82-33438# Drexel Univ., Philadelphia, Pa.
FRACTURE MECHANICS OF DELAMINATION: INITIATION AND GROWTH Final Report, 1 Oct. 1979 - 30 Sep. 1981
A. S. D. Wang and M. Slomiana Jan. 1982 170 p refs
(Contract N62269-79-C-0270)
(AD-A115728; NADC-79056-60) Avail: NTIS HC A08/MF A01 CSCL 11/4

This report describes the results from an experimental and analytical study on the fracture mechanics of delamination. Experiments have been conducted using the AS-3501-06 graphite-epoxy laminates in order to observe delamination growth of various geometrical and loading conditions. Static and fatigue crack growth under both tension and compressive loads are studied. The experiments helped to identify and isolate the most important loading, geometry and material parameters which influence the delamination processes. Predictive models are then developed to model these processes, based on the linear elastic fracture mechanics concept of energy release rate. The models are executed by a finite element routine which simulates the crack growth process. Extension of the energy method to the growth process under constant amplitude fatigue loads leads to the concept of constant damage states. This concept is readily applied in a cumulative damage model for fatigue under spectrum loading. Author (GRA)

N82-33439# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
A FRACTURE AND BALLISTIC PENETRATION RESISTANT LAMINATE Final Report
Joseph F. Throop Jun. 1982 39 p refs Presented at the 1982 Army Sci. Conf., West Point, N. Y., 15-18 Jun. 1982
(DA Proj. 1L1-61102-AH-60)
(AD-A117142; ARLCB-TR-82016) Avail: NTIS HC A03/MF A01 CSCL 11/6

A new metal/metal laminate has been conceived and developed, consisting of explosively bonded alternate layers of titanium and aluminum alloy sheets. Intended at first to give improved fatigue resistance in helicopter components, the laminate is found to provide improved impact and ballistic penetration resistance as well. In comparison to monolithic metal components or adhesively bonded laminates it can provide decreased weight and increased durability and survivability for vehicles and craft subject to ballistic impact damage. GRA

N82-33440# Army Propulsion Lab., Cleveland, Ohio. Applied Technology Lab.
THERMAL FATIGUE BEHAVIOR OF FP ALUMINA/MAGNESIUM COMPOSITES
Ramakrishna T. Bhatt 18 Jun. 1982 9 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117292) Avail: NTIS HC A02/MF A01 CSCL 11/4

The effects of cyclic and isothermal thermal exposure on the axial and transverse tensile strength and axial moduli of 55 volume percent FP-A1-2O3/QH21A Mg composites have been evaluated to understand the cause of thermally induced strength degradation and to help determine the limiting use conditions for these composites. Specific findings are as follows: (1) Thermal cycling of FP-A12O3/QH21A Mg composites to 250 C for 2000 cycles did not cause any appreciable room temperature strength or modulus loss compared with baseline data for untreated composites. In contrast, composites thermally cycled to 350 C showed considerable loss in both axial strength and modulus. No appreciable loss in room temperature transverse tensile strength of composites was measured after thermal cycling. (2) Measurement of the transverse strength and fractographic analysis of thermally cycled composites indicated interface void formation and matrix cracking and fiber debonding as prime contributors to observed strength and modulus losses. These results are consistent with degradation mechanism based on thermal-induced stresses in the matrix. (3) No appreciable loss in the axial dynamic modulus of these composites was observed after isothermal exposure. Small strength losses observed in isothermally heated composites were attributed to matrix softening. (4) The high temperature mechanical properties were not measured for the composites in this study. This would be required to properly design using FP-Al2O3/QH21A composites. GRA

N82-33441# Oklahoma Univ., Norman. School of Aerospace Mechanical and Nuclear Engineering.
RESEARCH ON DYNAMICS OF COMPOSITE AND SANDWICH PLATES, 1979 - 1981
C. W. Bert Jul. 1982 40 p refs
(Contract N00014-78-C-0647; NR Proj. 064-609)
(AD-A117946; OU-AMNE-82-3; TR-27) Avail: NTIS HC A03/MF A01 CSCL 11/4

This report presents a survey of the literature concerning dynamics of plate-type structural elements of either composite material or sandwich construction. Papers from mid-1979 through early 1982 are reviewed, as are a few 1978 and early 1979 references unavoidably omitted in 1979 (Technical Report No. 5); there is a total of 167 references. Particular attention is given to experimental research and to linear and nonlinear analysis. Configurations include rectangularly orthotropic, cylindrically orthotropic, and anisotropic plates; laminated; plates; and thick and sandwich plates. Free and forced vibration, panel flutter, and impact are considered. Author (GRA)

N82-33442# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Materials Integrity Branch.
MECHANICAL PROPERTIES OF E293/1581 FIBERGLASS-EPOXY COMPOSITE AND SEVERAL ADHESIVE SYSTEMS Final Report, Jun. 1980 - Sep. 1981
David C. Watson May 1982 50 p refs
(AF Proj. 2418)
(AD-A117902; AFWAL-TR-82-4013) Avail: NTIS HC A03/MF A01 CSCL 11/4

Mechanical properties have been generated on E293/1581 fiberglass-epoxy composite and several different adhesive systems. Three flat panels of this composite were supplied. Several panels having adhesive joints were also supplied having the E293/E-glass fabric composite laminates bonded; to itself, to steel, and to aluminum honeycomb material. Several types of adhesives, both film and foam adhesives, were used in bonding the single lap joint panels and the composite-honeycomb sandwich panel.

Tensile, flexure, and interlaminar shear data were obtained on specimens removed from the flat panels parallel to the warp fabric direction and at room temperature and 280 deg F (138 degrees C). Single lap shear tests were conducted on specimens removed from the adhesively bonded panels. Three point flexure and edgewise compression tests were conducted on specimens removed from the composite-aluminum honeycomb sandwich panel. Author (GRA)

N82-33443# Utah Univ., Salt Lake City. Dept. of Civil Engineering.
FATIGUE OF LAMINATED COMPOSITE STRUCTURES Final Report, 24 Oct. 1979 - 23 Apr. 1982
George J. Dvorak Jul. 1982 17 p refs
(Contract DAAG29-79-C-0049)
(AD-A117731; UTEC-82-063ARO-17126.4-EG) Avail: NTIS HC A02/MF A01 CSCL 11/4

The purpose of the work supported by this contract was to investigate the mechanisms of fatigue in fibrous metal matrix composites and laminates. The approach to the problem was based on two simultaneous research efforts. In the theoretical part of the program, the elastic-plastic behavior of unidirectional and laminated composites was described with the help of the Vanishing Fiber Diameter (VFD) model. The model simplifies the geometry of the microstructure by assuming that each of the reinforcing fibers has a vanishingly small diameter and that the fibers occupy a finite volume fraction of the composite. Thus the strain fields in both fiber and matrix are uniform. Overall constitutive equations of the elastic-plastic composite aggregate were derived from the properties of the constituents, their volume fractions, and geometry of the microstructure. The theory was extended to the case of in-plane mechanical loading of symmetric laminated plates. Also, a finite element code for three dimensional analysis of elastic-plastic composite structures was developed and used in selected applications, which included investigations of stress fields at circular holes and cracks in laminated plates. Shakedown limits of certain laminated plates used in the experiments were also established. Work was started on analysis of distributed fracturing in unidirectional composites. GRA

N82-33444# California Univ., Livermore. Lawrence Livermore Lab.
NONDESTRUCTIVE INSPECTION AND EVALUATION OF COMPOSITE-MATERIAL FLYWHEELS
D. M. Boyd, B. W. Maxfield, S. V. Kulkarni, and A. J. Schwarber 24 Feb. 1982 12 p refs 2 Vol.
(Contract W-7405-eng-48)
(DE82-014875; UCRL-53264-Vol-1) Avail: NTIS HC A02/MF A01

Several composite panels and flywheels designs were evaluated in support of the Mechanical Energy Storage Technology project. Conventional nondestructive evaluation technology as used on the panels and flywheels. All flywheels and panels were radiographed and, where practical, were also inspected using ultrasonic techniques The results provided information about the structural features of flywheels and materials. This information is useful for the quality control of fabrication procedures. The detection of apparent flaws in fabrication cannot be related to the ultimate strength until failure mechanisms in composite materials have been fully defined. Therefore, the location of detected flaws should be recorded for later comparison with dynamic and destructive evaluations. DOE

N82-33445# Cambridge Univ. (England). Dept. of Engineering.
DAMAGE ACCUMULATION DURING FATIGUE OF COMPOSITES
A. Poursartip, M. F. Ashby, and P. W. R. Beaumont Nov. 1981 29 p refs
(PB82-182312; CUED/C-MATS/TR-85-1981; ISSN-0309-6505)
Avail: NTIS HC A03/MF A01 CSCL 11D

A damage-accumulation approach to the fatigue of composites is outlined. Differential equations for the rate of change of damage are developed, and integrated to give fatigue life. The approach is tested by applying it to published fatigue data. The merits of the method are that it relates closely to physical models of cracking and decohesion, that it can be extended to multiaxial loading, and that, once established, the equations can be integrated for variable load histories to give real service lives for engineering components. GRA

N82-33446# Cambridge Univ. (England). Dept. of Engineering.
CORRELATIONS FOR THE FRACTURE OF COMPOSITE MATERIALS
J. K. Wells and P. W. R. Beaumont Jul. 1981 20 p refs
(PB82-181421; CUED/C-MATS/TR-84-1981; ISSN-0309-6505)
Avail: NTIS HC A02/MF A01 CSCL 11D

A number of existing theories for both the notched and unnotched strength of fiber composite materials are discussed. These are compared with a large body of existing data which is presented in the form of master plots. These plots show the similarity of behavior of carbon, glass and Kevlar laminates of a variety of constructions, and also identify two distinct failure regimes. GRA

N82-33447# Cambridge Univ. (England). Dept. of Engineering.
HYGROTHERMAL EFFECTS ON THE MICROMECHANISMS OF CRACK EXTENSION IN GLASS FIBRE AND CARBON FIBRE COMPOSITES
P. D. Anstice and P. W. R. Beaumont 1980 14 p refs Sponsored in part by Science Research Council
(Grant AF-AFOSR-3644-78)
(PB82-176728; CUED/C-MATS/TR-72-1980; ISSN-0309-6505)
Avail: NTIS HC A02/MF A01 CSCL 11D

Hygrothermal aging effects and the micromechanisms of crack extension in glass fiber and carbon fiber composites are described. Failure data based on direct observation of fibers debonding, breaking and pulling out of a cracked epoxy matrix are presented and summarized in cumulative probability diagrams which provide a convenient means for the comparison of fracture behavior of composite systems. These diagrams also demonstrate the effects of changes in environment and time in a given experiment in a manner useful for the failure analysis of a fibrous composite. GRA

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N82-33448 Utah Univ., Salt Lake City.
PHOTOACOUSTIC SPECTROSCOPY AT VISIBLE AND INFRARED WAVELENGTHS Ph.D. Thesis
Lindsay Bruce LLoyd 1981 143 p
Avail: Univ. Microfilms Order No. DA8203387

Photoacoustic spectroscopy (PAS) has been shown to be a useful method for obtaining spectral information from highly light scattering or opaque condensed phase samples. The PA signal is dependent on the intensity and wavelength of the incident light, the chopping frequency of the light, and, under certain conditions, the absorption coefficient of the sample. In a gas coupled microphone cell, the PA signal is also dependent on the surface area of the sample. The relatively low surface area of liquid samples makes it difficult to obtain an acceptable signal-to-noise ratio in PAS using a gas coupled microphone cell. A piezoelectric transducer (PZT) detected liquid cell gave a lower detection limit and a higher sensitivity than a microphone cell. Undiluted whole blood samples gave visible PA spectra which were independent of the optical absorption coefficient of the blood (photoacoustic saturation). PAS of isotonically diluted blood resulted in a visible PA spectrum similar to the optical spectrum of oxyhemoglobin. Dissert. Abstr.

N82-33449 State Univ. of New York, Buffalo.
THE ADSORPTION AND OXIDATION OF CARBON MONOXIDE IN STRONG ACID SOLUTIONS Ph.D. Thesis
Joseph David Jolson 1981 284 p
Avail: Univ. Microfilms Order No. DA8204075

The electrochemical oxidation of carbon monoxide was studied on various electrode materials. The experimental evidence showed detectable oxidation only at high overvoltage even at the most active electrode materials. Of those materials studied the oxidation of carbon monoxide on platinum remained near the convective diffusion controlled value for the longest time period. The most striking feature of the current voltage curve for carbon monoxide oxidation at a rotating platinum disk electrode was the sharp current avalanche peak which preceded the limiting current region during the anodic going scan. This strongly suggested the formation of an adsorbate at cathodic potentials which was later oxidized as the potential became more anodic. The oxidation currents observed during the cathodic scan at potentials cathodic of the avalanche peak suggested that this adsorbate poisoned the platinum surface toward the oxidation of carbon monoxide from the bulk.
Dissert. Abstr.

N82-33450 Illinois Univ., Urbana-Champaign.
HIGH PRESSURE NMR STUDIES OF THE DYNAMIC STRUCTURE OF LIQUIDS Ph.D. Thesis
Dennis Lloyd Hasha 1981 160 p
Avail: Univ. Microfilms Order No. DA820348

The high pressure high resolution nuclear magnetic resonance technique at high fields is developed and used to study the conformational isomerization of cyclohexane in solution. The solvents used are methylcyclohexane-d sub 14, carbon disulfide and acetone-d sub 6. It is found that the activation parameters obtained from the temperature dependence of the rate constant are independent of the solvent. However, the coalescence temperature in the methylcyclohexane-d sub 14 solvent is 1.5 C higher than in the other two solvents. It is observed that ring inversion in cyclohexane is accelerated when pressure is applied. This pressure dependence which is nonlinear is more pronounced in acetone-d sub 6 and carbon disulfide than in the more viscous methylcyclohexane-d sub 14 solvent. This behavior provides the first experimental proof of the breakdown of transition state theory, thus confirming recent predictions of stochastic models for isomerization reactions in condensed phases. Dissert. Abstr.

N82-33451 Illinois Univ., Urbana-Champaign.
MICROWAVE SPECTROSCOPY OF WEAKLY BOUND MOLECULAR COMPLEXES Ph.D. Thesis
Lestyer William Buxton 1981 80 p
Avail: Univ. Microfilms Order No. DA8203413

The pure rotational high resolution microwave spectra of weakly bound molecular complexes are discussed. These complexes, consisting of a polar linear molecule and a rare gas atom or other molecule as the bound partner, have binding energies ranging from 0.2 to 6.0 kcal/mole. Formation of the complexes is achieved by a molecular free jet expansion of the monomeric components in an inert carrier gas. The expanding gas is directed into a Fabry-Perot cavity where the rotational transitions of the species of interest are excited with a microwave pulse. The subsequent coherent molecular emission can be detected and analyzed to yield structural and electronic information about the complex. The Fabry-Perot pulsed Fourier transform microwave technique is briefly outlined. This method was used for all the experiments.
Dissert. Abstr.

N82-33452 Northeastern Univ., Boston, Mass.
STUDIES IN ON-LINE REVERSED PHASE LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY Ph.D. Thesis
1981 181 p
Avail: Univ. Microfilms Order No. DA8205041

A continuous extraction interface is evaluated as a means of combining a mass spectrometer with a liquid chromatograph operated in the reversed phase model. Through the use of the interface, solutes are extracted into a volatile solvent which is then admitted to the MS, while polar mobile phase components, as well as inorganic modifiers, are effectively eliminated. The theoretical considerations involved in this interfacing concept are discussed and the application of the LCMS system to the analysis of carbamate pesticides is presented. The continuous extraction interface is applied to the LCMS analysis of ionic compounds through the use of ion pairing techniques. The MS properties of a series of model ion pairs are examined for their compatibility with on line analysis, and the feasibility of conducting on line LCMS analysis in the ion pairing mode is demonstrated: A scheme to rationalize the results observed with various model ion pairs under MS conditions is presented, and significant improvements in the design and operation of the continuous extraction interface are discussed. The methodologies developed are applied to the analysis of peptides. Means for controlling the extraction efficiency of peptides in the interface and the pertinence of mass spectra obtained with the LCMS system for peptide sequence determination are considered. Dissert. Abstr.

N82-33453 California Univ., Davis.
THEORETICAL AND PRACTICAL CONSIDERATIONS OF SOME ASPECTS OF GAS CHROMATOGRAPHIC OPTIMIZATION Ph.D. Thesis
David Fletcher Ingraham 1981 98 p
Avail: Univ. Microfilms Order No. DA8205011

The applicability of window analysis to fused silica capillary gas chromatography was investigated. For this purpose, two mixtures were utilized: (1) a fermentation mixture comprised mainly of low molecular weight alcohols, and (2) a mixture of low boiling solvents used in the fooding packaging industry. The pure compounds contained in these mixtures were run on each of the pure liquid phases DB-1 and Carbowax 20M and their distribution constants determined. Window diagrams were plotted and columns were constructed by connecting together appropriate lengths of columns containing the above liquid phases. Because of the lower partition coefficients encountered with capillary columns as compared with packed columns, resolution was found to be a better measure of separation than as the relative retention, and window diagrams incorporating resolution were also produced. It was also found that the pressure drop across the column and the carrier gas compressibility had to be considered when calculating the lengths of columns to be used. When these additional factors were taken into account, both mixtures were easily separated.
Dissert. Abstr.

N82-33454 Northeastern Univ., Boston, Mass.
INVESTIGATIONS INTO A MORE GENERAL SOLUTION TO THE PROBLEM OF MATRIX INTERFERENCES IN COMBINED ATOMIZER ATOMIC ABSORPTION SPECTROMETRY Ph.D. Thesis
Zoe A. Grosser 1981 198 p
Avail: Univ. Microfilms Order No. DA8205037

The use of a combined electrothermal-flame atomizer as a general solution to the problem of matrix interferences in atomic absorption spectrometry is examined. The combined atomizer, utilizing a carbon filament 6.5mm in diameter was optimized with a nitrogen sheath with respect to several parameters. Thermal studies further characterized the filament. The combined atomizer was tested with three flames to investigate the utility in interference reduction. Hydrogen-nitrogen-entrained air was shown to be especially useful in removing interferences of MgCl2 from Pb and Cd, and Ca from Sn. This flame was not as useful in removing the interferences of NaCl and Ca from Pb and Cd. The airpropane flame provides moderate recovery of the element signals from the interferences tested. The helium-oxyacetylene flame, removes the interferences tested in all cases. Sensitivity losses averaging 50% were noted when replacing the nitrogen sheath with a flame. The generally smaller magnitude of vapor phase interferences observed with the carbon filament device when compared to the semienclosed atomizer can be explained by spatial separation of the atom population and the interferent cloud in the vapor phase above the carbon rod. Transient signals acquired with a minicomputer system for a semienclosed atomizer with Pb, Cd, Sn, and

various interferents demonstrate the viability of the hypothesis.
Dissert. Abstr.

N82-33455 Michigan Univ., Ann Arbor.
VOLTAMMETRIC STUDIES OF A MULTIPURPOSE MEMBRANE ELECTRODE Ph.D. Thesis
Ronald Dormond-Herrera 1981 116 p
Avail: Univ. Microfilms Order No. DA8204639

A general purpose three-electrode voltammetric membrane cell was developed and tested as a detector for water disinfectants and oxygen. Analysis of O2, O3, ClO2, HOCl/Cl2 was possible. Studies emphasized O3, and ClO2 determinations. The electrode response was characterized under steady state and transient potentiostatic conditions. Transient conditions offered the best sensitivities and limits of detection. For O3 and ClO2 limits of detection of 20 ppb and 15 ppb were found. A programmable microprocessor-controlled analytical system was used for wave generation/data collection and processing. The combination microprocessor-controlled analytical system/voltammetric membrane electrode can be integrated into a closed-loop control system for water disinfection operations. Current readings of the pulsed-membrane electrode were utilized to control the rates of disinfectant dosing and/or generation. system feasibility was demonstrated by controlling ozone levels in a closed water circulation arrangement.
Dissert. Abstr.

N82-33456 Illinois Univ., Urbana-Champaign.
RAMAN STUDIES OF REORIENTATIONAL AND VIBRATIONAL RELAXATION IN DENSE FLUIDS Ph.D. Thesis
Steven James Perry 1981 150 p
Avail: Univ. Microfilms Order No. DA8203551

The reorientation relaxation in tetrafluoromethane and propyne, and the vibrational relaxation in propyne and group IV tetramethyl compounds are studied. The anisotropic Raman spectrum of the E band in CF4 has been measured as a function of temperature and pressure. It is shown that the reorientational motion of CF4 in the dense fluid and moderately dense gas region is best described by the Fokker-Plank-Langevin model rather than the extended J-diffusion model. Two methods of testing reorientational models are discussed. The independent measurement of the reorientational correlation time and the angular momentum correlation are measured and the quantities are compared to the model dependent relationships. The reorientational motion of propyne in the liquid phase and in solutions with inert and active solvents is reported as a function of temperature and pressure.
Dissert. Abstr.

N82-33457 Columbia Univ., New York.
MULTIPHOTON IONIZATION AND FRAGMENTATION PATHWAYS OF POLYATOMIC MOLECULES: STUDIES WITH A LASER TIME-OF-FLIGHT MASS SPECTROMETER Ph.D. Thesis
Kenneth Robert Newton 1981 216 p
Avail: Univ. Microfilms Order No. DA82045

Laser multiphoton ionization and fragmentation of several polyatomic molecules was studied in a series of experiments in a time of-flight mass spectrometer. By making use of electron impact ionization or laser multiphoton ionization to create a set of ions, and a second laser to separately fragment them, the complete fragmentation pathway of these ions was investigated. A table of the fractions of each ion of benzene that dissociate to smaller ions is presented. Fragmentation is observed with a Nd:YAG pumped dye laser as well as a flashlamp-pumped dye laser, allowing comparisons of the effect of laser pulse length and spectral bandwidth on the fragmentation process. Significant amounts of fragmentation are observed with both lasers in one, two, and three photon fragmentation steps for t-butylbenzene, fluorobenzene, and iodobenzene ions. Multiphoton ionization (MPI) fragmentation studies of several other molecules were made at a series of wavelengths and powers as an experimental test of the statistical theories of MPI-fragmentation. Using two colors from the same laser, separated by a delay of 14 ns, ionization and fragmentation was observed from the A excited state of triethylenediamine. At higher powers, extensive fragmentation is observed. In addition, mass-selected MPI excitation spectra of triethyleediamine are observed, demonstrating the possibilities of complete two dimensional mass/vibronic spectral analysis of polyatomics. An HCl/HF chemical laser with cryosorption pumping of the reaction exhaust and its use to vibrationally excite a beam of HCl molecules are described.
Dissert. Abstr.

N82-33458# Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Actinide Technology Div.
LOADING AND UNLOADING RESIN FROM MPPF RAPID ION EXCHANGE COLUMNS
W. C. Ng Oct. 1981 26 p refs
(Contract DE-AC09-76SR-00001)
(DP-1609) Avail: NTIS HC A03/MF A01

A process was developed which permits changing the resin in the Multipurpose Processing Facility Rapid Ion Exchange columns, without replacing the entire column assembly. The columns remain on the rack during the resin removal and replacement. The resin displacement process consists of a resin unloading and a resin loading step. During resin removal, the spent resin is hydraulically displaced from the columns to a resin collection tank, and then transferred to the evaporator for dissolution. Fresh resin is loaded into the empty column by hydraulic displacement or a combination of vacuum loading followed by hydraulic displacement. In the hydraulic displacement loading process, the amount of fresh resin needed to load the columns is transferred to a resin displacement tank where the resin is hydraulically displaced to the appropriate column.
B.W.

N82-33459*# Arizona State Univ., Tempe. Planetary Geology Group.
A PRIMER ON SULFUR FOR THE PLANETARY GEOLOGIST Summary Report
Eilene Theilig Washington NASA Sep. 1982 38 p refs
(NASA-CR-3594; NAS 1.26:3594) Avail: NTIS HC A03/MF A01 CSCL 07D

Sulfur has been proposed as the dominant composition for the volcanic material on Io. Sulfur is a complex element which forms many intramolecular and intermolecular allotropes exhibiting a variety of physical properties. Cyclo-S8 sulfur is the most abundant and stable molecular form. The important molecular species within liquid sulfur change in concentration with temperature. Concentrations of the allotropes control the physical properties of the melt. Discontinuities in density, viscosity, and thermal properties reflect the polymerization process within liquid sulfur. Variations in the melting point are related to autodissociation of the liquid. Many solids forms of sulfur have been identified but only orthorhombic alpha and monoclinic beta sulfur, both composed of cyclo-S8 sulfur, are stable under terrestrial conditions. Physical properties of solid sulfur are dependent on the allotrope and, in some cases, the thermal history. Three natural terrestrial sulfur flows are described: (1) Siretoko-Iosan, Japan; (2) Volcan Azufre, Galapagos Islands; and (3) Mauna Loa, Hawaii. All of the flows are associated with fumarolic areas and are considered to have formed by the melting and mobilization of sulfur deposits. Surface textures of the flows indicate a behavior of molten sulfur similar to that of silicate lava. Channels, rivulets, and lobate edges were described for the flows. The solidification of man-made sulfur flows formed as part of the Frasch mining process by which sulfur is removed from the subsurface in a liquid state is described.
J.D.

N82-33460# Norwegian Defence Research Establishment, Kjeller.
THE BEHAVIOUR OF Al ELECTRODES IN AQUEOUS SOLUTIONS
Torstein Valand Aug. 1981 83 p refs
(NDRE/Publ-81/1003; NDRE-376-VM-159; ISSN-0085-4301) Avail: NTIS HC A05/MF A01

The behavior of oxide covered Al electrodes in aqueous solutions is treated. The behavior at low electrode potentials, i.e., below approximately -1.0 V (SCE) is emphasized. Based on the general theories of passivation, a thermodynamic treatment of the electrode is reported. Results from experiments with pure and

alloyed Al are given. Usually, the potential step technique was used in these experiments, but other techniques, such as capacity measurements, were also applied. These results are discussed in the light of the thermodynamic treatment, especially when the ion transfer and the oxide formation process is considered. The cathodic hydrogen evolution reaction was treated by assuming that the step involving electron transfer is rate determining. The effects of oxide thickness and alloying elements on the hydrogen evolution reaction are discussed in accordance with this assumption. In this connection, the effect of separate phases formed on the electrode surface by the alloying elements is also discussed. S.L.

N82-33461# National Research Council of Canada, Ottawa (Ontario). Canada Inst. for Scientific and Technical Information.
AERATION-AGITATION CONTROL BASED ON A MATHEMATICAL MODEL OF THE FERMENTATION PROCESS
L. M. Kuzmina et al 1982 15 p refs Transl. into ENGLISH from Khim. Farm. Zh. (Moscow), v. 14, no. 12, 1980 p 75-81
(NRC/CNR-TT-2029; ISSN-0077-5606) Avail: NTIS HC A02/MF A01

Oxygen requirements of microorganisms in certain culture apparatus under specific conditions can be determined experimentally by regulating biosynthesis to obtain a regime under which the rate of oxygen consumption is at a maximum. It was determined at the same time that there is a range of values of the governing factors which ensure the maximum value for the rate of oxygen consumption. The model of variable scale segregation which was developed made it possible to construct an algorithm for calculating the optimum values for the governing factors during the fermentation process itself. S.L.

N82-33462# National Research Council of Canada, Ottawa (Ontario). Canada Inst. for Scientific and Technical Information.
SPHERICAL AGGLOMERATION OF FLOCCULATED PRECIPITATE
Jaroslaw Neczaj-Hruzewicz and Jerzy Szczypa 1982 33 p refs Transl. into ENGLISH from Wiadomosci Chemi. (Poland), v. 39, 1980 p 577
(NRC/CNR-TT-2024; ISSN-0077-5606) Avail: NTIS HC A03/MF A01

A technique of separating hydrophilic fine solids from aqueous suspensions is presented. A well consolidated solid of low moisture content and clear water is produced. The technique is suitable for processing bulk quantities of aqueous suspensions. S.L.

N82-33463*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CHEMICAL AND ELECTROCHEMICAL BEHAVIOR OF THE Cr(3)/Cr(2) HALF CELL IN THE NASA REDOX ENERGY STORAGE SYSTEM
David A. Johnson (Spring Arbor Coll.) and Margaret A. Reid 1982 21 p refs Presented at The 162nd Meeting of the Electrochem. Soc., Detroit, 17-22 Oct. 1982
(Contract DE-AI04-80AL-12726)
(NASA-TM-82913; E-1318; DOE/NASA/12726-17; NAS 1.15:82913) Avail: NTIS HC A02/MF A01 CSCL 10C

The Cr(III) complexes in the NASA Redox Energy Storage System were isolated and identified as Cr(H2O)6(+3) and Cr(H2O)5Cl(+2) by ion exchange chromatography and visible spectrophotometry. The cell reactions during charge-discharge cycles were followed by means of visible spectrophotometry. The spectral bands were resolved into component peaks and concentrations calculated using Beer's Law. During the charge mode Cr(H2O)5Cl(+2) is reduced to Cr(H2O)5Cl(+) and during the discharge mode Cr(H2O)5Cl(+) is oxidized back to Cr(H2O)5Cl (+2). Both electrode reactions occur via a chloride-bridge inner-sphere reaction pathway. Hysteresis effects can be explained by the slow attainment of equilibrium between Cr(H2O)6(+3) and Cr(H2O)5Cl(+2). Author

N82-33464# Royal Aircraft Establishment, Farnborough (England).
A LABORATORY MODEL FOR THE EVALUATION OF THE TOXIC NATURES OF COMBUSTION PRODUCTS [MODELE DE LABORATOIRE POUR EVALUER LA TOXICITE DES PRODUITS DE COMBUSTION]
J. M. Jouany, J. M. Presles, and J. Pre Feb. 1982 22 p refs Transl. into ENGLISH from Proceedings of the AGARD Conf. on Toxic Hazards in Aviation (Canada), 1980 p 1-14 Conf. held in Toronto, 1980
(RAE-TRANS-2083; BR84018; AGARD-309(B16)) Avail: NTIS HC A02/MF A01

The evaluation of the toxic natures of the products arising from the thermal degradation of materials must be capable of giving a classification, of a certain number of criteria. A relatively simple screening method is defined in comparison with the more complex biological examinations. An oven is proposed which allows the speeds of combustion of the materials to be measured. Animal intoxications were carried out on rats, either left with spontaneous ventilation (breathing) or placed under assisted ventilation (breathing). Different standards of observation were chosen. In the analysis of the results, transformation of all the raw values into their reduced, adjusted values, and the calculation of a modified Pearson index, allows the classification of the materials to be obtained by an overall index. S.L.

N82-33465# National Research Council of Canada, Ottawa (Ontario). Canada Inst. for Scientific and Technical Information.
AUTO-OXIDATION OF SULPHITES
J. Veprek-Siska and S. Lunak 1982 29 p refs Transl. into ENGLISH from Chem. Listy (Prague), v. 75, 1981 p 113-131
(NRC/CNR-TT-2023; ISSN-0077-5606) Avail: NTIS HC A03/MF A01

The mechanism of oxidation by molecular oxygen was investigated. A mechanism which is at variance with the generally accepted radical chain mechanism was formulated. The mechanism presented does not require the assumption of intermediary formation of radical intermediate products. Reactions considered were the auto-oxidation of sulfites, the thermal oxidation of sulfite catalyzed by copper ions, the photoinitiated reaction catalyzed by Fe(III) and Mn(III), the photosensitized reaction, and the catalyzed thermal reaction with an inhibitor present. J.D.

N82-33466# Texas Univ., Austin. Dept. of Chemistry.
THERMAL DESORPTION OF H2 AND CO ON Pt/TiO2 Technical Report, 26 Jan. - 31 Dec. 1982
J. A. Schreifels, D. N. Belton, J. M. White, and R. L. Hance (Abilene Christian Univ.) 23 Jul. 1982 10 p refs Submitted for publication
(Contract N000014-75-C-0922; NR Proj. 056-578)
(AD-A117888; TR-26) Avail: NTIS HC A02/MF A01 CSCL 07/4

Thermal desorption of D2 from oxidized titanium surfaces, covered with various amounts of platinum, shows no detectable irreversible adsorption for up to three monolayers of Pt when the substrate temperature is 130K. Twelve monolayers of Pt give a substrate that adsorbs significant amounts of both CO and H2. GRA

N82-33467# Ohio State Univ., Columbus. Dept. of Chemistry.
STUDIES ON THE SYNTHESES OF BORON HYDRIDE SYSTEMS Final Report, 1 Jul. 1978 - 30 Sep. 1981
Sheldon G. Shore 20 Nov. 1981 13 p refs
(Grant DAAG29-78-G-0112; RF Proj. 761119/711144)
(AD-A115817; ARO-15611.9-C; LPN-OSURF-761119/711144) Avail: NTIS HC A02/MF A01 CSCL 07/3

The preparation of boron hydrides through hydride ion abstraction was investigated. Good yields were obtained when the borane anions BH4(-), B3H8(-), B4H9(-), and B9H14(-) were treated with a molar equivalent of a Lewis acid BX3 (X=F, Cl, or Br), generally in the absence of a solvent, for reaction periods of one to four hours. A method for high yield conversion of B5H9 to B9H14(-) is presented as the precursor to the practical conversion of B5H9 to B10H14. Additionally a good conversion of B5H9 to n-B18H22 and the preparation of the nido-carborane phi 2C2B8H10 were

achieved. The hydride ion abstractions by BBr3 and BCl3 lead to the anions HBBr3(-) and HBCl3(-). J.D.

N82-33468# Army Mobility Equipment Research and Development Center, Fort Belvoir, Va.
NEW VIEWPOINTS IN MASS FILTER DESIGN
Melvin H. Friedman, Joseph E. Campana, and Alfred L. Yergey 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117295) Avail: NTIS HC A02/MF A01 CSCL 07/4

Explicit differential equations in closed form have been found for pole piece geometries which are generalizations of those used in the QMF. For arbitrarily shaped pole pieces, the solution of Laplace's equation cannot be written in closed form and, thus in general the ion differential equations of motion cannot be written in closed form. The geometries shown in figures 4, 5 and 6 are analytically useful in determining if other geometries might yield mass filters with improved resolution/transmission characteristics. Computer simulation of ion motion in these geometries is a subject for future research. The principal new results of our research are: (1) new derivations of the equations which describe ion motion in a QMF, 2) the equations of pole pieces for hexapole, octupole and decapole geometries illustrated in figures 4, 5 and 6, (3) closed form differential equations of ion motion in these geometries (equations (17), (20) and (21) and (4) the realization that the inverted pendulum is a mechanical analog of the QMF. GRA

N82-33469# Wisconsin Univ., Milwaukee. Dept. of Chemistry.
FIFTH INTERNATIONAL SUMMER INSTITUTE IN SURFACE SCIENCE, ISISS 1981 Final Report, 15 Apr. 1981 - 14 Apr. 1982
Ralph Vanselow 8 Jul. 1982 23 p refs Inst. held at Milwaukee, Wis., 1981
(Grant N00014-81-G-0059)
(AD-A116933) Avail: NTIS HC A02/MF A01 CSCL 07/4

At the Fifth International Summer Institute in Surface Science, twenty leading scientists presented tutorial review talks on gas-solid and solid-solid interfaces. Paper topics include: 'Development of Photoemission as a Tool for Surface Analysis - From Semiconductors to Catalysis'; 'Auger Spectroscopy as a Probe of Valence Bands'; 'Laser Fluorescence Spectroscopy of Sputtered Atoms'; 'Chemisorption Investigated by Ellipsometry'; 'He Atom Diffraction from Semiconductor Surfaces'; 'Electron Energy Loss Spectroscopy of Surface Vibrations'; 'High Resolution LEED Studies of Adsorbed Films'; 'UHV Electrochemistry'; 'Field Desorption and Photon-Induced Field Desorption'; 'Monte Carlo Simulations of Chemisorbed Overlayers'; 'Critical Phenomena of Chemisorbed Overlayers'; 'Some Theoretical Aspects of Metal Clusters, Surfaces and Chemisorption'; 'Electronic Aspects of Adsorption Rates'; 'Impact of Steps and Imperfections on Surface Studies'; 'The Use of Electron Microscopy in Surface Science'; 'SIMS of Reactive Surfaces'; 'Electronegativity -- A Useful Concept in Surface Chemistry'; 'Surface Segregation Studied by Low Energy Ion Scattering'; and 'Effects of Internal Surface Adsorption on Metallurgical Properties. Author (GRA)

N82-33470# Michigan State Univ., East Lansing. Dept. of Chemistry.
DETERMINATION OF CARBON MONOXIDE IN AIR BY TRIPLE QUADRUPOLE MASS SPECTROMETRY
R. Kazmer Latven and Christie G. Enke 15 Jul. 1982 22 p refs
(Contract N00014-76-C-1092)
(AD-A117443; TR-10) Avail: NTIS HC A02/MF A01 CSCL 07/4

Carbon monoxide has been determined at parts-per-million concentration in the presence of carbon dioxide, nitrogen, and hydrocarbons by triple quadrupole mass spectrometry (TQMS). In this work, advantage is taken of the ability of TQMS to distinguish differing ions of the same mass. The first quadrupole mass filter selects m/z 28; these selected ions undergo collisionally activated decomposition in the RF-only quadrupole collision cell and the CO+ product ion at m/z 12 is mass filtered by the third quadrupole and detected. Quantitation of the CO concentration is achieved by the addition of a known amount of labeled internal standard, 13CO, which displays a fragmentation peak at m/z 13 when the first mass filter selects the parent at m/z 29. Side-by-side comparison with the m/z 12 peak from CO allows the determination of CO concentration to within 20% down to 10 ppm.Author (GRA)

N82-33471# Michigan State Univ., East Lansing. Dept. of Electrical Engineering and Systems Science.
ADAPTIVE SAMPLING FOR ENHANCED PERFORMANCE OF AN ION DETECTION SYSTEM FOR A TRIPLE QUADUPOLE MASS SPECTROMETER Interim Technical Report
R. S. Matthews, C. G. Enke, and P. D. Fisher 15 Jul. 1982 117 p refs
(Contract N00014-76-C-1092)
(AD-A117441; TR-8) Avail: NTIS HC A06/MF A01 CSCL 07/4

Detection and tabulation of mass-selected ions are the primary means of data acquisition for mass spectrometers. Previous detection systems have been limited in dynamic range, or in data throughput, so that inefficient and limited use of the ion information resulted. Analysis of the statistical properties of randomly arriving ions and the use of state-of-the-art technologies have led to the development of an enhanced ion detection system (IDS) for a triple quadrupole mass spectrometer (TQMS). An adaptive sampling technique maximizes data throughput without distorting relative error or limiting dynamic range. This microprocessor-based system measures flux rates from 10 to the zero power to 10 to the 9th power ions per second up to a maximum relative error of 1%; sampling periods are reduced to their statistically defined minimums. Preliminary tests have validated the correctness of the IDS design along with its capability for on-line customized operation through the use of powerful and flexible high-level software.
Author (GRA)

N82-33472# Texas Univ., Austin. Dept. of Chemistry.
CHARACTERIZATION OF SPECIES ADSORBED ON OXIDIZED AND REDUCED ANATASE Technical Report, 1 Jan. - 1 Dec. 1982
Katsumi Tanaka and J. M. White Jul. 1982 19 p refs Submitted for publication
(Contract N00014-75-C-0922; NR Proj. 056-578)
(AD-A117891; TR-24) Avail: NTIS HC A02/MF A01 CSCL 07/4

The adsorption of water, pyridine carbon dioxide and carbon monoxide were studied by infrared absorption spectroscopy on reduced and oxidized anatase. There are two kinds of isolated OH groups, as well as two kinds of adsorbed water molecules, for the anatase powders used in this study. These species are assigned to adsorption on different crystal faces. The water and hydroxyl species are more stable on oxidized anatase. Some sites where OH groups are readily formed are thought to have different coordination as compared to sites where water is held. The coordination number of the Ti ions is 4 for water adsorption and 4 or 5 for OH. No surface Bronsted acidity is detected by pyridine adsorption. The surface hydroxyl groups, working as OH minus react with coordinated CO2 to form carbonate species when the oxidized surfaces are exposed to CO2. The resulting bicarbonate species decompose to form water molecules which, upon evacuation, dissociate to some extent so that OH groups are partially recovered. On oxidized anatase, room temperature CO exposure gave rise to some surface reduction and two different kinds of adsorbed CO were detected. Author (GRA)

N82-33473# Texas Univ., Austin. Dept. of Chemistry.
DISSOCIATIVE ADSORPTION OF CO2 ON OXIDIZED AND REDUCED Pt/TiO2 Technical Report, 1 Jan. - 31 Dec. 1982
Katsumi Tanaka and J. M. White Jul. 1982 11 p refs Submitted for publication
(Contract N00014-75-C-0922; NR Proj. 056-578)
(AD-A117890; TR-25) Avail: NTIS HC A02/MF A01 CSCL 07/4

On both oxidized and reduced Pt/TiO2, carbon dioxide decomposes at room temperature to form chemisorbed oxygen atoms and carbon monoxide. In the absence of Pt no decomposi-

tion was found. On reduced samples, the oxygen atoms were stabilized on the titania support and reacted further with CO2 to form adsorbed bidentate carbonate. On reduced Pt/TiO2, the adsorbed CO produced in the decomposition reaction produced a linearly bound species at step sites in the initial stages of the reaction. As the reaction proceeded, CO adsorbed linearly on terrace sites was found. On oxidized Pt/TiO2, the decomposition rate was much slower and only linear step site species were observed. From the results we conclude that Pt step sites are the active sites for CO2 dissociation. Author (GRA)

N82-33474# Illinois Inst. of Tech., Chicago. Dept. of Chemical Engineering.

SELECTIVE METAL-ION EXTRACTION FOR MULTIPLE-ION LIQUID-LIQUID EXCHANGE REACTIONS Final Report, 1 Jun. 1979 - 31 May 1982

L. L. Tavlarides 29 Jan. 1982 36 p refs Prepared in cooperation with Syracuse Univ.

(Contract DE-AS02-79ER-10406)

(DE82-011721; DOE/ER-10406/T3) Avail: NTIS HC A03/MF A01

Hydrometallurgical solvent extraction research to develop a fundamental means to predict selectivity during simultaneous solvent extraction of multiple metal ions when the kinetic rats and thermodynamic equilibria both do not favor the desired metal is discussed. To this end the chemical kinetics and thermodynamic chemical equilibria models for the system copper-iron-acid sulfate solutions extracted by (ALPHA)-alkenyl-8-hydroxy quinoline in xylene are studied. These models can be employed with appropriate design equations to predict selectivity factors for two phase contactors. An aqueous phase ionic equilibrium model is available which can be used to calculate concentration of various Fe(III) ionic species present. Iron extraction data were obtained using a high intensity stirrer with an in line centrifugal separator, and a shaker bath apparatus. DOE

N82-33475# Miami Univ., Fla. Div. of Marine and Atmospheric Chemistry.

THE INTERACTION OF MANGANESE(II) WITH THE SURFACE OF CALCITE IN DILUTE SOLUTIONS AND SEAWATER

Martin L. Franklin and John W. Morse Jul. 1981 29 p refs

(Contract W-7405-eng-48)

(DE82-011104; LBL-13707) Avail: NTIS HC A03/MF A01

The interaction of Mn2 with the surface of calcite in aqueous solutions is complex. In dilute solutions the Mn2 is rapidly adsorbed, MnCO3 nucleates on the calcite surface and then grows by a first order reaction with respect to the initial Mn2 concentration. At higher ionic strengths, in NaCl solutions, the rate of these processes is slower, but the same general pattern persists. In solutions containing Mq2, at the concentration of seawater and in seawater, the nucleation phase of the uptake process does not appear to occur. The long term uptake rate of Mn2 on the surface of calcite in seawater is first order with respect to the dissolved Mn2 concentration. The rate constant is over 3 orders of magnitude smaller than that found in dilute Mq2 free solutions. A probable explanation for the slower growth rate in seawater is that MnCO3 is not nucleated on the calcite surface due to the presence of high Mn2 concentrations, preventing enough Mn2 from being adsorbed to reach a critical concentration. Measurements of the solubility of rhodochrosite in seawater gave results from an undersaturation approach to equilibrium in excellent agreement with those found in previous studies in dilute solutions. When equilibrium was approached from supersaturation, approximately 50 times more calcium was precipitated than Mn2. The measured solubility was over twice that determined from undersaturation. It is possible that a Mn calcite containing 25 to 30 mole percent MnCO3 formed on the rhodochrosite from the supersaturated solutions. Consequently, it is doubtful that rhodochrosite controls the concentration of Mn2 in calcium carbonate rich marine environments. DOE

N82-33476# Pennsylvania State Univ., University Park. Dept. of Materials Science and Engineering.

MOESSBAUER SPECTROSCOPIC AND RELATED CHARACTERIZATION OF FISCHER-TROPSCH CATALYSTS Annual Report for period ending 28 Feb. 1981 M.S. Thesis

L. N. Mulay and Cary C. Lo Mar. 1981 96 p refs Submitted for publication

(Contract DE-AC22-79PC-10350)

(DE82-009280; DOE/PC-10350/T1) Avail: NTIS HC A05/MF A01

Medium pore (diameter approximately 6 angstrom) zeolites such as ZSM-5 and Silicalite impregnated with Group VIII metals provide selective catalytic pathways for the conversion of coal derived synthesis gas to gasoline or olefins. Mossbauer and magnetic studies on these catalysts containing Fe or Fe + Co are reported. The zeolites were impregnated with metal nitrate solutions, reduced and carbided to yield the active catalyst. The freshly impregnated samples showed Fe(3) type spectra. The ZSM-5 (14.7% Fe) and Silicalite (13.6% Fe) samples exposed to H2 (4500 C) showed approx. 85% reduction to the metallic state. The carbided ZSM-5 (14.7% Fe) revealed a spectrum of Hagg carbide (Fe5C2), an active component of the catalyst. The used catalysts showed mixtures of Hagg carbide (Fe5C2) and cementite (Fe3C). DOE

N82-33477# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.

ATOMIZATION CHARACTERISTICS OF COAL-WATER MIXTURES

C. R. Krishna, P. Marnell, and T. A. Butcher 1982 12 p refs Presented at the 4th Intern. Symp. on Coal Slurry Combust., Orlando, Fla., 10-12 May 1982

(Contract DE-AC02-76CH-00016)

(DE82-009093; BNL-30895; CONF-820519-2) Avail: NTIS HC A02/MF A01

The air atomization of coal water fuels is discussed. A standard air atomizer was used in the experiments. A Malvern particle sizer was used to acquire the drop size distribution. The drop size was measured as a function of the key atomizer parameters, namely, the air pressure and the ratio of fuel and atomizing air mass flow rates. Measurements were made using water to give the baseline and a coal water mixture with 33 percent of weight coal. Some of the important conclusions are: (1) at similar atomizing conditions (that is, same air pressure and fuel to air mass flow ratio), the mass median diameter for the coal water mixtue was consistently less than that for the water; (2) the difference noted above decreased for low fuel/air mass flow; that is, when the mean diameter became small; and (3) the distribution (within the accuracy of measurement). DOE

N82-33478# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

PROGRESS IN THE ENTRAINED-FLOW, FAST-ABLATIVE PYROLYSIS OF BIOMASS Annual Report, Oct. 1980 - Sep. 1981

James P. Diebold and John Scahill Mar. 1982 36 p refs

(Contract DE-AC02-77CH-00178)

(DE82-009911; SERI/PR-234-1456) Avail: NTIS HC A03/MF A01

The construction of a 1-t/d conceptual demonstration reactor to fast pyrolyze biomass chips using an ablative pyrolysis technique in a cyclonic reactor has been completed. A tar vapor cracking tube with seven thermodynamic lengths downstream of the cyclonic reactor has the capability to change the product slate from mostly tars to nearly all gases containing significant amounts of ethylene and other olefins. Char formation is deliberately suppressed with this reactor design. The design features of the reactor are described in detail. The system has undergone extensive shakedown tests which have served to familiarize the personnel with the operation and to identify minor design modifications which have improved the system's operability and flexibility. Preliminary pyrolysis results are similar to those observed with smaller entrained flow pyrolysis reactors. DOE

N82-33479# Department of Energy, Pittsburgh, Pa. Energy Technology Center.

HYDROPROCESSING OF SOLVENT-REFINED COAL: CATALYST-SCREENING RESULTS

Gary J. Stiegel, Richard E. Tischer, and Leon M. Polinski Mar. 1982 103 p refs

(DE82-008568; DOE/PETC/TR-82/7) Avail: NTIS HC A06/MF A01

Four catalysts for hydroprocessing a 50 wt% mixture of SRC-I in a prehydrogenated creosote oil using a continuous flow unit. All catalysts employed were nickel-molybdates with varying properties. Reaction conditions were 2000 psi, 8 SCFH of hydrogen, volume hourly space velocity of 0.6 to 1.0 cc of SRC-I/hr/cc of catalyst, and 48 hours at 7500 F followed by 72 hours at 7800 F. The results indicate that the Shell 324 catalyst is best for hydrogenation of the feedstock but only marginally better than CB 81-44 for denitrogenation. The CB 81-44 catalyst may be slightly better than Shell 324 for the conversion of the +8500 F fraction of the feedstock. Desulfurization was uniformly high for all catalysts. Catalysts with a bimodal pore size distribution (i.e., SMR7-6137(1)) appear to be better for denitrogenation than unimodal catalysts (i.e., SMR7-6137(4)) containing the same metals loading. Unimodal catalysts (i.e., Shell 324) with higher metals loadings are comparable to bimodal catalysts (i.e., CB 81-44) containing less metals. DOE

N82-33480# General Electric Co., Schenectady, N. Y. Research and Development Center.

SIGNIFICANT PARAMETERS IN THE CATALYZED CO2 GASIFICATION OF COAL CHARS

C. L. Spiro, D. W. McKee, P. G. Kosky, E. J. Lamby, and D. H. Maylotte 1982 30 p refs

(Contract DE-AC21-80MC-14591)

(DE82-008508; DOE/MC-14591/T1) Avail: NTIS HC A03/MF A01

Alkali and alkaline earth carbonates have been used to catalyze the CO2 gasification of coal chars prepared by pyrolysis of Illinois No. 6 coal. We have found that alkaline earth carbonates are fair gasification catalysts, through throughputs are insensitive to loadings in the range of 5 to 20% by weight. The order of efficacy is Ba > Sr > Ca. Alkali carbonates are excellent catalysts, with throughputs showing a dependence on loadings and atomic number. In particular, at high loadings (20% wt) the order is Cs > K > Na > Li. As kinetic parameters for the alkali carbonate Boudouard reaction with coal chars differ significantly from that of graphites, an alternative redox cycle mechanism has been proposed involving an alkali hydride intermediate. GRA

N82-33481# Pittsburgh and Midway Coal Mining Co., Englewood, Colo.

SOLVENT REFINED COAL (SRC) PROCESS. EFFECT OF MIXING ENERGY ON HYDROGEN REACTION RATES IN SRC-11 REACTORS

C. P. P. Singh, Y. T. Shah, and N. L. Carr Jan. 1982 40 p refs

(Contract DE-AC05-76ET-10104)

(DE82-008447; DOE/ET-10104/50) Avail: NTIS HC A03/MF A01

An attempt was made to analyze theoretically the conditions which may lead to hydrogen starvation in SRC-II reactors. Literature correlations for mass transfer coefficients in bubble columns were combined with experimental data from a stirred vessel (CSTR) on the basis of specific power consumption. Specific power consumption, i.e., consumption of mixing energy per unit volume per unit time, is proportional to N(3), where N is the stirred speed, and approximately proportional to superficial gas velocity (Ug) in a bubble column. For operating conditions selected to give maximum practicable reaction rate, i.e., under conditions of highest possibility of hydrogen starvation, results indicate that the fractional decrease in the rate of reaction would be insignificant (<4%) for superficial gas velocity, Ug, above 1 cm/s. Based on the present study, it is believed that the higher the gas velocity (the longer the reactor) in the large scale reactor situation, hydrogen reaction rates will not be significantly influenced by mass transfer in normal operation of the reactor. DOE

N82-33482# California Univ., Livermore. Lawrence Livermore Lab.

MOLTEN PHOSPHATE ELECTROLYTE FOR THE ELECTROLYSIS OF WATER

Pamela K. Shell, Peter Cottrell, and Oscar H. Krikorian 12 Feb. 1982 12 p refs

(Contract W-7405-eng-48)

(DE82-008211; UCID-19319) Avail: NTIS HC A02/MF A01

Phosphate based molten salts are identified as potential electrolytes for the high temperature electrolysis of water and for possible use in the Lithium Hydride Thermochemical Cycle. The behavior of polymeric, partially neutralized phosphoric acid is observed with respect to its thermal stability, ability to receive steam, and its corrosiveness to potential electrode materials. The results of these tests are favorable and warrant further, more quantitative studies of the suitability of phosphate melts as electrolytes for water electrolysis. DOE

N82-33483# Solvent Refined Coal International, Inc., Englewood, Colo.

STATUS REPORT FOR THE SOLVENT-REFINED-COAL (SRC-2) DEMONSTRATION PROJECT Final Summary Report

Feb. 1982 424 p

(Contract DE-AC05-78OR-03055)

(DE82-009653; DOE/OR-03055/T2) Avail: NTIS HC A19/MF A01

The status of the process design and related activities of the solvent refined coal (SRC-2) demonstration project are discussed. The following subjects are addressed: descriptions, including block flow diagrams, of the overall plant and of the individual units within the plant; rationale for the selection of the specific process used in each of the plant units; significant design and process changes which have been made since the Phase Zero conceptual design. Areas of technical risk and recommended mitigative actions; general operating philosophy; status of the various design project activities, such as environmental, permitting, and research and development support are also discussed. The purpose of the SRC-2 Demonstration Project was to demonstrate the technical and ecomonic viability of the SRC-2 process with large scale equipment so that the risk of subsequent commercialization activity would be reduced. DOE

N82-33484# Battelle Pacific Northwest Labs., Richland, Wash.

DEVELOPMENT OF A SOLID ABSORPTION PROCESS FOR REMOVAL OF SULFUR FROM FUEL GAS Final Report

G. E. Stegen Mar. 1982 131 p refs

(Contract DE-AC21-79ET-11028)

(DE82-012996; DOE/ET-11028/1164) Avail: NTIS HC A07/MF A01

Development of the solid supported molten salt process as a method for removing sulfur from fuel gases at temperatures above 7000 C is described. The process uses molten salts contained within the pores of a porous solid substrate material as a sorbent for sulfur. Laboratory and bench scale process development work on the process is summarized. This work demonstrated efficient sulfur removal, sorbent regenerability, sorvent durability over 40 absorption/regeneration cycles, and the ability to produce a concentrated H2S vent gas (up to 52% dry) during regeneration. DOE

N82-33485# Advanced Fuel Research, Inc., East Hartford, Conn.

COAL GASIFICATION REACTIONS WITH ON-LINE IN-SITU FTIR ANALYSIS

P. R. Solomon and D. G. Hamblem 18 Dec. 1981 61 p refs

(Contract DE-AC01-81FE-05122)

(DE82-005658; DOE/FE-05122/T1) Avail: NTIS HC A04/MF A01

The entrained flow reactor was tested with four coals at temperatures up to 1200 C. The reactor works well and in situ gas analysis by Fourier transform infrared spectroscopy can be routinely performed. The initial data were reduced and compared to a previously developed pyrolysis model. The agreement between theory and experiment is good. The reactor, and plans for

modification to improve the accuracy and completeness of the data are described. The pyrolysis model is reviewed and the most recent modifications employing distributed rate kinetics are discussed. The pyrolysis results are discussed and compared with the prediction of the model. DOE

N82-33486# Argonne National Lab., Ill. Chemical Engineering Div.
RAMAN SPECTROSCOPY FOR IN-SITU MONITORING OF ELECTRODE PROCESSES
Ravi Varma, G. M. Cook, and N. P. Yao Apr. 1982 51 p refs
(Contract W-31-109-eng-38)
(DE82-014909; ANL/OEPM-82-2) Avail: NTIS HC A04/MF A01

Raman spectroscopic techniques are used to study battery electrode processes. The potential of Raman spectroscopy as an in situ analytical tool for the characterization of the structure and composition of electrode surface layers at electrode-electrolyte interfaces during electrolysis is examined. This understanding of the battery electrode processes is helpful in designing battery active material with improved performance. The applications of Raman spectroscopy to the in situ study of electrode processes were demonstrated in a few selected areas, including: (1) the anodic corrosion of lead in sulfuric acid, and (2) the anodization and sulfation of tetrabasic leadsulfate in sulfuric acid. Preliminary results on the anodization of iron and on the electrochemical behavior of nickel positive electrode active material in potassium hydroxide electrolytes are presented. DOE

N82-33487# Argonne National Lab., Ill. Fossil Energy Program.
TECHNICAL EVALUATION: PRESSURIZED FLUIDIZED-BED COMBUSTION TECHNOLOGY
S. A. Miller, G. J. Vogel, S. M. Gehl, J. E. Hanway, Jr., R. F. Henry, K. M. Parker, E. B. Smyk, W. M. Swift, and W. F. Podolski Apr. 1982 246 p refs
(Contract W-31-109-eng-38)
(DE82-014903; ANL/FE-81-65) Avail: NTIS HC A11/MF A01

The technology of pressurized fluidized bed combustion, particularly in its application to a coal burning combined cycle plant, is evaluated by examining the technical status of advanced concept plant components - boiler system (combustor, air handling and air injection equipment, and heat exchangers); solids handling, injection, and ejection system; hot gas cleanup equipment; instrumentation control system; and the gas turbine - along with materials of plant construction. Environmental performance as well as energy efficiency are examined, and economic considerations are reviewed briefly. The evaluation concludes with a broad survey of the principal related research and development programs in the United States and other countries, a foreview of the most likely technological developments, and a summary of unresolved technical issues and problems. DOE

N82-33488# Little (Arthur D.), Inc., Cambridge, Mass.
STAND-ALONE IGNITION DEVICES Final Report, 1 Dec. 1980 - 1 Nov. 1981
Richard F. Topping Nov. 1981 55 p refs
(Contract GRI-5080-345-0375)
(PB82-180662; GRI-81/0019) Avail: NTIS HC A04/MF A01 CSCL 13A

Promising concepts for residential, non-pilot gas ignition systems for residential heating not requiring conventional electric connection were identified. Recommendations for future work to accelerate commercialization are presented. Concepts identified by a comprehensive literature survey and research task were evaluated. Overall feasibility, stage of development, applicability, reliability, cost/benefit, environmental impact, and safety were considered. Objective criteria were used to technically rank near and far term concepts and, assuming introduction during the mid to late 1980's, the commercial viability of each technically feasible concept was estimated. GRA

N82-33489# Environmental Protection Agency, Ann Arbor, Mich. Standards Development and Support Branch.
CONVERSION OF AMMONIA PLANTS TO METHANOL PRODUCTION
Daniel P. Heiser Feb. 1982 18 p refs
(PB82-177494; EPA-AA-SDSB-82-3) Avail: NTIS HC A02/MF A01 CSCL 07A

The technical feasibility and capital cost of converting an ammonia plant to a methanol plant, both using natural gas as a feedstock is examined. It was determined that the ammonia industry, which currently produces about 20 million tons of ammonia per year in the United States, could convert their facilities to produce 16.4 million tons per year of methanol, or a fuel oil equivalent of 150,000 barrels per day. Such a conversion would cost about $2.1 billion, compared to a cost of $3.1 billion for building new natural gas based methanol plants of the same capacity. While converting ammonia plants to methanol production has favorable capital costs over that of building new plants, the savings of one third is not large, particularly considering the effects of eliminating (or reducing) ammonia production. Thus, it would appear at this time that large savings cannot be obtained from the conversion of ammonia plants to methanol production. GRA

N82-33490# Environmental Protection Agency, Ann Arbor, Mich. Standards Development and Support Branch.
EXXON DONOR SOLVENT COAL LIQUEFACTION PROCESS
John McGuckin Feb. 1982 23 p refs
(PB82-177460; EPA-AA-SDSB-82-8) Avail: NTIS HC A02/MF A01 CSCL 07A

The history, technological feasibility, product quality, and cost of the Exxon doner process is examined. Available design studies addressing the process are critiqued and the best description and cost estimates are selected. The conclusion reached is as follows: a recent study by Exxon Research and Engineering was found to contain the most recent information on the EDS process. Increased costs and lowered process efficiencies render all older studies out-of-date. GRA

N82-33491# Environmental Protection Agency, Ann Arbor, Mich. Standards Development and Support Branch.
THE H-COAL AND SRC-2 PROCESSES
Daniel P. Heiser Feb. 1982 53 p refs
(PB82-173998; EPA-AA-SDSB-82-7) Avail: NTIS HC A04/MF A01 CSCL 07A

The product quality and cost of the H coal and solvent refined coal II (SRC-II) processes are examined. Available design studies addressing these processes are critiqued and the most accurate description and cost estimates are selected. The critique of the available studies shows that costs in constant dollars have risen dramatically over the last five years and that most of the available studies are now out of date. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-33492# Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
FATIGUE BEHAVIOUR OF ADVANCED STRUCTURAL ALUMINIUM ALLOY 74575-T761
A. Buch, A. Berkovits, and D. Mushinski Jun. 1981 20 p refs
(TAE-447) Avail: NTIS HC A02/MF A01

Fatigue data on the 7475-T761 aluminum alloy is evaluated. The calculated crack initiation lives for interference fit lugs made from this alloy were compared with lives of lugs made from conventional 7075 and 2024 alloys in the case of maneuver loading spectrum. S.L.

N82-33493*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A STUDY OF THE NATURE OF SOLID PARTICLE IMPACT AND SHAPE ON THE EROSION MORPHOLOGY OF DUCTILE METALS
P. Veerabhadra Rao (NAS-NRC), Stanley G. Young, and Donald

H. Buckley Jul. 1982 19 p refs Presented at Microscopy of the Degradation of Mater. (Wear and Erosion), MICRO 82, Intern. Symp. and Exhibition, London, 12-16 Jul. 1982; sponsored by the Royal Microscopical Society
(NASA-TM-82933; E-1298; NAS 1.15:82933) Avail: NTIS HC A02/MF A01 CSCL 11F

Impulsive versus steady jet impingement of spherical glass bead particles on metal surfaces was studied using a gas gun facility and a commercial sand blasting apparatus. Crushed glass particles were also used in the sand blasting apparatus as well as glass beads. Comparisons of the different types of erosion patterns were made. Scanning electron microscopy, surface profilometry and energy dispersive X-ray spectroscopy analysis were used to characterize erosion patterns. The nature of the wear can be divided into cutting and deformation, each with its own characteristic features. Surface chemistry analysis indicates the possibility of complex chemical and/or mechanical interactions between erodants and target materials. S.L.

N82-33494*# Solar Turbines International, San Diego, Calif.
ADVANCED CERAMIC COATING DEVELOPMENT FOR INDUSTRIAL/UTILITY GAS TURBINES Final Report, 11 Mar. 1979 - 1 Sep. 1981
James W. Vogan and Alvin R. Stetson Jan. 1982 128 p refs
(Contracts DEN3-109; DE-AI01-77ET-3111)
(NASA-CR-169852; DOE/NASA/0109-1; NAS 1.26:169852; SR82-R-4792-28) Avail: NTIS HC A07/MF A01 CSCL 11F

A program was conducted with the objective of developing advanced thermal barrier coating (TBC) systems. Coating application was by plasma spray. Duplex, triplex and graded coatings were tested. Coating systems incorporated both NiCrAly and CoCrAly bond coats. Four ceramic overlays were tested: ZrO2.8203; CaO.TiO2; 2CaO.SiO2; and MgO.Al2O3. The best overall results were obtained with a CaO.TiO2 coating applied to a NiCrAly bond coat. This coating was less sensitive than the ZrO2.8Y2O3 coating to process variables and part geometry. Testing with fuels contaminated with compounds containing sulfur, phosphorus and alkali metals showed the zirconia coatings were destabilized. The calcium titanate coatings were not affected by these contaminants. However, when fuels were used containing 50 ppm of vanadium and 150 ppm of magnesium, heavy deposits were formed on the test specimens and combustor components that required frequent cleaning of the test rig. During the program Mars engine first-stage turbine blades were coated and installed for an engine cyclic endurance run with the zirconia, calcium titanate, and calcium silicate coatings. Heavy spalling developed with the calcium silicate system. The zirconia and calcium titanate systems survived the full test duration. It was concluded that these two TBC's showed potential for application in gas turbines. Author

N82-33495*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
ULTIMATE INTRINSIC COERCIVITY SAMARIAN-COBALT MAGNET. AN EARTH BASED FEASIBILITY STUDY FOR SPACE SHUTTLE MISSIONS Final Report, 1 Oct. 1979 - 30 Jun. 1982
D. Das, K. Kumar, R. T. Frost (GE), and C. W. Chang (GE) Jul. 1982 59 p refs
(Contract NAS8-33607)
(NASA-CR-170627; NAS 1.26:170627; R-1571) Avail: NTIS HC A04/MF A01 CSCL 11F

Techniques for the electromagnetic containerless reaction of samarium with cobalt for the formation of samarium-cobalt alloys are summarized. The effort expended to reduce and instrument the oxygen partial pressure in the reaction chamber and coolant gas system are described as well as the experiments in which these improvements were shown to be partially effective. A stainless steel glove box capable of being evacuated to low 10 to the -6th torr pressure and refilled with ultra-pure argon was built and installed. Necessary accessories to perform SmCo5 powder preparation, compaction and subsequent encapsulation of the powder inside a hot isostatic pressing cannister were designed, built, and incorporated into the chamber. All accessories were tested for proper functioning inside the chamber. Using the facility, the first batch of densified SmCo5 powder was fabricated to near total density. Analysis of the densified compacts shows that oxygen contamination during fabrication was near zero. A.R.H.

N82-33496*# Clemson Univ., S.C. Coll. of Engineering.
HOT TENSILE TESTS OF INCONEL 718 Final Report
24 Nov. 1980 32 p refs
(Contract NAS8-33524)
(NASA-CR-162089; NAS 1.26:162089) Avail: NTIS HC A03/MF A01 CSCL 11F

The physical metallurgy of near-solidus integranular cracking in Inconel 718 welds was investigated. The data, although inconclusive, suggest at least two mechanisms which might explain intergranular cracking (microfissuring) in the heat-affected zone of several high temperature alloys. One theory is based on the separation of intergranular liquid while the other involves mechanical failure of solid liguments surrounded by intergranuiar liquid. Both mechanisms concentrate strain in the grain boundaries resulting in low strain (<1%) intergranular brittleness. The mechanisms reported might also pertain to the physical metallurgy of casting, powder metallurgy sintering and hot isostatic pressing. Author

N82-33497# Pennsylvania Univ., Philadelphia. Dept. of Materials Science and Engineering.
EFFECTS OF RESIDUAL IMPURITIES ON HYDROGEN ASSISTED CRACKING IN HIGH STRENGTH STEELS
N. Bandyopadhyay and C. J. McMahon, Jr. Jun. 1982 76 p refs 2 Vol.
(Contract N00019-79-C-0523)
(AD-A116966) Avail: NTIS HC A05/MF A01 CSCL 11/6

In practice, the methods often proposed to prevent the hydrogen embrittlement problems involve design modification, changes in fabrication techniques, changes in material properties such as composition and heat treatment which involve changes in yield strength and microstructure of the material, and environmental control such as anodic or cathodic protection or lowering of the concentration of certain embrittling species such as H, H2S, Cl, etc. GRA

N82-33498# Pennsylvania Univ., Philadelphia. Dept. of Materials Science and Engineering.
EFFECTS OF RESIDUAL IMPURITIES ON HYDROGEN ASSISTED CRACKING IN HIGH STRENGTH STEELS, PART 1
N. Bandyopadhyay and C. J. McMahon, Jr. Jun. 1982 128 p refs 2 Vol.
(Contract N00019-78-C-0327)
(AD-A116948) Avail: NTIS HC A07/MF A01 CSCL 11/6

Intergranular brittle fracture in steels can be induced either by the segregation of certain solute elements to the grain boundaries or by the segregation of absorbed hydrogen under stress. Alloying elements in steel are generally added because of their beneficial effects on the mechanical properties. However, certain elements from groups IV, V and VI of the periodic table e.g. Sn, Sb, As, P, S, etc., when present in small quantities as impurities along with the usual alloying elements like Ni, Cr, Mn, Si, etc., can deteriorate the mechanical properties drastically by lowering the cohesion at the grain boundaries and thereby resulting in an intergranular brittle fracture along the prior austenite grain boundaries. These problems, often encountered in service, are generally known as 'temper embrittlement', (TME) tempered martensite embrittlement, (HE) hydrogen embrittlement, (SCC) stress corrosion cracking, etc. The purpose of the present investigation was to clarify the effects of these impurity elements in promoting TME and intergranular cracking in a hydrogen atmosphere at low stress intensity levels. GRA

N82-33499# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
FRACTURE AND FATIGUE CHARACTERISTICS IN TITANIUM ALLOYS Final Report, 1 Jul. 1979 - 30 Sep. 1981
C. G. Rhodes, M. R. Mitchell, and J. C. Chesnutt Jun. 1982 125 p refs
(Contract N00014-79-C-0567; NR Proj. 031-824; NR Proj. 471)

(AD-A117155; SC5227-1FR) Avail: NTIS HC A06/MF A01 CSCL 11/6

The influence of sub-transus solution treatment on room temperature fracture toughness of Ti-6Al-4V (6-4) and Ti-4.5Al-5Mo-1.5Cr (CORONA-5) has been studied as a function of elemental partitioning and volume fraction of alpha and beta phases. Scanning/transmission electron microscopy was used to analyze quantitatively the microstructural components of the two alloys. It was found that, for as-solution treated condition, fracture toughness of 6-4 increased as volume fraction of primary alpha, aluminum content of primary alpha, aluminum content of beta phase, or vanadium content of beta phase decreased. Similarly, for as-solution treated CORONA-5, increases in volume fraction of primary alpha, aluminum and molybdenum contents of primary alpha, or chromium content of beta phase led to a decrease in toughness. In the case of solution-treated and aged 6-4, the analysis indicated that toughness was improved by increasing the vanadium content of the beta phase, increasing the size of secondary alpha plates, reducing the aluminum content of primary alpha, or by reducing the volume fraction of retained beta. Aging CORONA-5 after solution treatment resulted in a very fine secondary alpha structure within transformed beta regions. GRA

N82-33500# Geo-Centers, Inc., Newton, Mass.
THE EFFECT OF CARBON AND BORON ON THE FRICTION BEHAVIOR OF TI-IMPLANTED 52100 BEARING STEEL AT LOW SLIDING SPEEDS
Russell A. Jeffries, Robert N. Bolster, and Irwin L. Singer May 1982 33 p refs
(N00173-80-C-0417)
(AD-A117742; GC-TR-82-184) Avail: NTIS HC A03/MF A01 CSCL 11/6

The low speed friction behavior of Ti implanted AISI 52100 bearing steel (1.5% Cr, 1% C by weight) may be altered by varying the concentration and distribution of the titanium and carbon present in the surface. With the aid of carbon which is either directly implanted or gettered during the implantation process, wear resistant, low friction surfaces may be produced. By assuring a sufficient supply of carbon, the Ti dosage required to produce a wear resistant surface may be reduced by more than 50%. Transmission electron microscopy of dual implants of carbon and titanium each at a dose of 2 x 10 to the 17th power showed that the surface was still crystalline and typical for a martensitic material. In contrast, friction testing of samples implanted with titanium and boron, another interstitial species forming wear resistant species (i.e., TiB2)), did not produce surfaces which were wear resistant nor substantially reduce the friction. Auger analysis in conjunction with ion milling was used to compare compositions of implanted surfaces. GRA

N82-33501# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
THERMAL MARTENSITIC TRANSFORMATION CYCLING IN Cu-Zn-Al SHAPE MEMORY ALLOYS M.S. Thesis
William E. Muesing Mar. 1982 62 p refs
(AD-A117589) Avail: NTIS HC A04/MF A01 CSCL 11/6

The effect of multiple thermal cycles between the martensitic phase and parent phase of selected Cu-Zn-Al alloys was studied. As thermal cycling progressed the martensite start temperature (Ms), parent phase finish temperature (Af), and the temperature at which the maximum martensitic peak height occurred (Mmax) were all observed to shift upward. GRA

N82-33502# Southwest Research Inst., San Antonio, Tex.
MULTI-ION INTERACTIONS AND DEFECTS IN METALS Final Report, 15 Mar. 1973 - 9 May 1982
R. E. Beissner 9 Jul. 1982 108 p refs
(Contracts DAAG29-79-C-0099; DAAG29-76-C-0031; DAHC04-73-C-0022; SwRI Proj. 15-5676)
(AD-A117451; ARO-167387.4-PH; ARO-10993.3-PH; ARO-13061.3-PH) Avail: NTIS HC A06/MF A01 CSCL 11/6

A summary of research on multi-ion interactions is presented. Emphasis is placed on point defects in nontransition metals and the calculation of screening charge densities, electric field gradients and lattice distortion. Multi-ion interactions in transition metals are also treated, as are calculations of stacking-fault energies in both transition and nontransition metals. Author (GRA)

N82-33503# Indiana Univ., Bloomington. Dept. of Chemistry.
METAL ALKOXIDES: MODELS FOR METAL OXIDES
Malcolm H. Chisholm 29 Jul. 1982 30 p refs
(Contract N00014-79-C-0044)
(AD-A117947; INDU/DC/TR-82/3-MC) Avail: NTIS HC A03/MF A01 CSCL 07/2

A structural analogy is noted between metal-oxides, metal-alkoxides and metal-oxide-alkoxides. This relationship holds for d(O) complexes and for d(n) complexes where the electrons may be used to form M-M bonds which may be used to form M-M bonds which may be localized and of either single or multiple bond order, or, delocalized in cluster molecular orbitals. These electrons in M-M bonds provide for oxidative-addition reactions and the binding of pi-acid ligands such as CO and alkynes. An extensive organometallic chemistry is implicated and certain facets of this are influenced by the pi-donor properties of oxo and alkoxy ligands. Author (GRA)

N82-33504# Pittsburgh Univ., Dept. of Metallurgical and Materials Engineering.
FUNDAMENTAL RESEARCH DIRECTED TO ADVANCED HIGH TEMPERATURE COATING SYSTEMS BEYOND THE CURRENT STATE-OF-THE-ART SYSTEMS Annual Report, 1 Jan. - 31 Dec. 1981
G. H. Meier and F. S. Pettit 1 Apr. 1982 12 p refs
(Grant AF-AFOSR-0089-80)
(AD-A117845; AFOSR-82-0548TR; AR-2) Avail: NTIS HC A02/MF A01 CSCL 11/3

The oxidation behavior of Ni-7.5 Si alloys has been studied in oxygen over the temperature range from 950 to 1150 deg C. The alloys exhibit significant transient oxidation but following this period oxidize at rates which are similar to those for Al2O3-forming systems. This slow rate is apparently due to the formation of sealing layer of SiO2 at the alloy/scale interface. The sealing layer appears to be slightly permeable to Ni which results in continued formation of NiO at the scale gase interface. GRA

N82-33505# Ultrasonics International, Inc., Trevose, Pa.
ULTRASONIC MEASUREMENT OF CASE DEPTH IN CASE HARDENED STEELS. EVALUATION OF FEASIBILITY FOR THE ULTRASONIC MEASUREMENT OF CASE DEPTH IN CASE HARDENED STEELS Final Report, Jan. - Jun. 1982
Morris S. Good Jul. 1982 55 p refs
(Contract N00014-82-C-0144)
(AD-A117901) Avail: NTIS HC A04/MF A01 CSCL 11/6

Various methods have been proposed for measuring case depth in case hardened steels. Each method as described in past literature is restricted in practical application due to problems in area localization, geometry, sensitivity, compositional changes due to carbon and/or nitrogen gradients formed during the hardening process. GRA

N82-33506# Michigan State Univ., East Lansing.
STUDIES ON AGE-HARDENING IN SPINODALLY MODULATED ALLOYS, EXPERIMENTAL AND THEORETICAL Progress Report, 1 Jul. 1981 - 30 Jun. 1982
K. N. Subramanian and M. Kato Jan. 1982 30 p refs
(Contract DE-AC02-81ER-10942)
(DE82-007957; DOE/ER-10942/1) Avail: NTIS HC A03/MF A01

As a theoretical part of this project, possibility of the thermally activated motion of a glide dislocation in spinodally decomposed alloys was considered. It was found that a double-kink, similar to that in a Peierls-Nabarro potential field, is formed in the dislocation during the activation process. The calculated activation energy, however, is very large compared with thermal energy and, thus, the barrier of the internal stress field caused by the spinodal decomposition is of long-range character. The experimental observation of the temperature and strain-rate independence of

the age-hardening in spinodal alloys can well be explained through this research. As an experimental part of this research, large-grain (about 2 mm) and single crystalline (over 1 cm) samples of a Cu-10Ni-6Sn alloy have been obtained by strain annealing, Bridgman and Czochralski methods for the future experiments. TEM observation of deformed Cu-Ni-Sn specimens indicates that the dislocation structure in aged (decomposed) specimens is quite different from that in as-quenched (homogenized) specimens. DOE

N82-33507# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
EFFECT OF SIMULATED MEDIUM-BTU COAL-GASIFIER ATMOSPHERES ON THE BIAXIAL STRESS-RUPTURE BEHAVIOR OF FOUR CANDIDATE COAL-GASIFIER ALLOYS
R. M. Horton Oct. 1981 43 p refs
(Contract DE-AC07-76ID-01570)
(DE82-010614; EGG-FM-5657) Avail: NTIS HC A03/MF A01

Tests of four candidate alloys for internal use in coal gasifiers (Type 310 stainless steel, Incoloy 800H, Haynes 188, and IN-657) were conducted in four simulated coal gasifier atmospheres (CGA) up to approximately 500 h, to determine whether their biaxial stress rupture strength and life were adversely affected. Exposure to these atmospheres at temperatures below 11720 K did not decrease these rupture properties below those measured in air. Only at 12550 K were the rupture properties in the various CGA atmospheres consistently below those measured in air at atmospheric pressure. DOE

N82-33508# Southwest Research Inst., San Antonio, Tex.
STRESS CORROSION CHARACTERIZATION OF TURBINE ROTOR MATERIALS, PHASE 1
F. F. Lyle, Jr. Feb. 1982 114 p refs
(EPRI Proj. 1929-5)
(DE82-902070; EPRI-NP-2237) Avail: NTIS HC A06/MF A01

A research program conducted to determine susceptability of steels used in low pressure (LP) turbine rotors of power plants to stress corrosion cracking (SCC) in LP turbine environments is described. The program included slow strain rate and sustained load SCC tests on samples from two 3.5 NiCrMoV rotor forgings. Environments included pure NaOH solutions, 3.5% NaCl, pure water, and mixtures of NaOH and NaCl, Na2S, Na2SO4, or CuO. Tests were conducted over a temperature range of 38 to 2040 C (100 to 400 OF). Supplementary electrochemical data also were generated. Slow strain rate test results indicate that the minimum NaOH concentration required to produce detectable SCC decreases with increasing temperature. Addition of small amounts of NaCl reduced the concentration of NaOH necessary to produce SCC at 1570 C (315 OF). Pure 3.5% NaCl induced SCC at 1210 C (2500 F). SCC was not detected in either steel in tests in pure water at 1570 C (3150 F). Sustained load test results indicate that long exposure times and high stress levels are necessary to initiate detectable cracking in NaOH solutions. DOE

N82-33509# Northwestern Univ., Evanston, Ill.
STUDIES OF METAL: SEMICONDUCTOR INTERFACES IN CATALYSIS AND ENERGY CONVERSION Annual Report, 15 Jun. 1981 - 14 Jun. 1982
Y. W. Chung Feb. 1982 42 p refs
(Contract DE-AS02-78ER-04946)
(DE82-011863; DOE/ER-04946/4) Avail: NTIS HC A03/MF A01

Carbon monoxide is chemisorbed molecularly on both Ni(111) and Ni/TiO2(100) surfaces near room temperature, but is suppressed by a factor of 2 to 2-1/2 on the Ni/TiO2(100) surface. X-ray photoemission reveals that the carbon is level for CO adsorbed on Ni/TiO2(100) has a smaller binding energy (by about 0.6 eV) than Ni(111), indicating chemical state differences. High pressure (up to 8Q Torr total pressure) CO hydrogenation studies on Ni/TiO2(100) showed that the methanation activity is a function of the average Ni thickness, reaching a maximum of about four times that of Ni(111) at a thickness of 5A. Substitution by deuterium results in no change in the methanation activity. On Ni(111), however, an inverse isotope effect was observed for the production of ethylene while on Ni/TiO2, a normal isotope effect was observed. The magnitude of the effect is a function of temperature. The photochemical activity of TiO2 in the photodissociation of water was examined in a specially constructed isolation cell with a sensitivity of 0.5 monolayer for hydrogen. DOE

N82-33510# Oak Ridge Y-12 Plant, Tenn.
THERMAL CONDUCTIVITY OF ELECTROLESS NICKEL-PHOSPHORUS ALLOY PLATING
D. D. Smith Apr. 1982 15 p refs
(Contract W-7405-eng-26)
(DE82-013529; Y-2269) Avail: NTIS HC A02/MF A01

Properties of specific heat, thermal diffusivity, density, and calculated thermal conductivity were determined for a modified acid bath electroless nickel-12.7 wt% phosphorous alloy between 298 and 423 K. Thermal conductivity values are about half those of pure nickel. DOE

N82-33511# Stanford Univ., Calif. Dept. of Materials Science and Engineering.
MODELLING OF DEFORMATION AND FRACTURE IN HIGH-TEMPERATURE STRUCTURAL MATERIALS Annual Progress Report, 1 Feb. 1981 - 28 Feb. 1982
Alan K. Miller Feb. 1982 64 p refs
(Contracts DE-AT03-76ER-70057; DE-AM03-76SF-00326)
(DE82-013040; SU-DMS-82-R-3) Avail: NTIS HC A04/MF A01

The development of models which can predict fracture of metals and alloys is described. Particular emphasis is placed on materials-limited aspect of energy technology which, in turn, leads to an emphasis on predicting fracture of high-temperature structural materials and fracture under complex histories and environments. Summaries of research progress are presented for: (1) modeling of fatigue crack initiation and growth; (2) modeling of strain softening; (3) modeling of multiaxial plastic flow; (4) development of a physical basis for calculating the MATMOD constants for alloys; and (5) subgrain and forest dislocation strengthing during isotropic hardening. Some of the highlights are: development of fatigue crack initiation and growth model; (FATIGMOD) which has the simulative and predictive capabilities to treat fatigue crack problems for smooth, small flow, and large flow conditions; application of FATIGMOD model to obtain constants for 707S-T6 aluminum alloy; MATMOD-4V equations are suitable starting basis for development of a general set of constitutive equations for multiaxial plasticity; data suggest that increasing the amount of Mg in Al can lead to increased strain rate sensitivity at high strain rates. DOE

N82-33512# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
REVIEW OF RECENT IRRADIATION-CREEP RESULTS
W. A. Coghlan May 1982 36 p refs
(Contract W-7405-eng-26)
(DE82-014570; ORNL-5844) Avail: NTIS HC A03/MF A01

Materials deform faster under stress in the presence of irradiation by a process known as irradiation creep. This phenomenon is important to reactor design and has been the subject of a large number of experimental and theoretical investigations. The investigations have been classified into four subgroups based on the different experimental methods used. These four are: (1) irradiation creep using stress relaxation methods, (2) creep measurements using pressurized tubes, (3) irradiation creep from constant applied load, and (4) irradiation creep experiments using accelerated particles. The similarity and the differences of the results from these methods are discussed and a summary of important results and suggested areas for research is presented. In brief, the important results relate to the dependence of creep on swelling, temperature, stress state and alloying additions. In each of these areas new results have been presented and new questions have arisen which require further research to answer. DOE

N82-33513# Bendix Corp., Kansas City, Mo.
BLENDED ELEMENTAL TITANIUM ALLOYS

M. G. Ulitchny Apr. 1982 20 p refs
(Contract DE-AC04-76DP-00613)
(DE82-012882; BDX-613-2763) Avail: NTIS HC A02/MF A01

The mechanical properties of blended elemental P/M Ti-6Al-4V and Ti-6Al-6V-2x alloys where x is either tin or zirconium are described. These materials are being considered as alternatives to forgings and extrusions. The properties of the Ti-6Al-4V alloy were disappointing; both strength and ductility were considerably below the guaranteed minimums for wrought material. The properties of the Ti-6Al-6V-2Sn material, however, proved to be as good as wrought material. It is recommended that some parts currently made or intended to be made from forgings be evaluated as blended elemental Ti-6Al-6V-2Sn P/M parts. DOE

N82-33514# California Univ., Livermore. Lawrence Livermore Lab.
ALUMINUM/CUPROUS OXIDE THERMITE
A. B. Shapiro and R. Gressmann 3 Mar. 1982 11 p refs
(Contract W-7405-eng-48)
(DE82-012866; UCRL-53189) Avail: NTIS HC A02/MF A01

Aluminum/cuprous oxide (Al/Cu2O) thermite is discussed with respect to reactant powder characterization, power contaminant extraction and reactant powder compaction into a consolidated pellet. Reaction and reaction product analysis is discussed. DOE

N82-33515# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
MICROSTRUCTURAL ANALYSIS OF AUSTENITIC STAINLESS STEEL WELDS AND THEIR MODIFICATION DURING LASER WELDING
S. A. David, J. M. Vitek, and W. H. Smith May 1982 27 p refs
(Contract W-7405-eng-26)
(DE82-016036; ORNL/TM-8276) Avail: NTIS HC A03/MF A01

The microstructure of austenitic stainless steel weld metal containing a duplex structure was fully characterized and its mode of formation explained. Four distinct ferrite morphologies were identified in type 308 stainless steel weld metal: vermicular, lacy, acicular, and globular. The first three ferrite types are related to transformations during and after solidification, and the fourth is related to the shape instability of the residual ferrite. Solidification behavior of type 308 stainless steel welds at high cooling rates was investigated with a high power laser system. The welds were made at speeds ranging from 13 to 63 mm/s. The welds made at 13 mm/s contained microstructures ranging from a fully austenitic structure at the root of the weld to a ferrite plus austenitic duplex structure at the crown. However, the welds made at 25 and 63 mm/s contained a nearly fully austenitic structure with less than 1% ferrite, and third phase particles rich in manganese and silicon were also found. The fully austenitic stainless steel welds were free of any cracking. The results are explained in terms of excessive undercooling at the tip of the ferrite cells at rapid solidification rates. This undercooling changes the mode of freezing from primary delta ferrite to primary austenite. DOE

N82-33516# General Electric Co., Schenectady, N. Y. Energy Systems Programs Dept.
LONG-TERM MATERIALS TEST PROGRAM: MATERIALS EXPOSURE TEST PLAN
Dec. 1981 24 p
(Contract DE-AC21-79ET-15457)
(DE82-013322; DOE/ET-15457/1111) Avail: NTIS HC A02/MF A01

Plans for the identification of corrosion resistant materials for coal fired gas turbine applications are described. Resistance of materials to long term accelerated corrosion will be determined through realistic PFB environmental exposure of candidate turbine materials for up to 14,000 hours. Selected materials also will be evaluated for their ability to withstand the combined erosive and corrosive aspects of the PFB effluent. A pressurized fluidized bed combustor facility burning high sulfur coal with moderate to high chlorine and alkali levels and utilizing dolomite as the sulfur sorbent is described. Hot gas cleanup is achieved using three stages of cyclone separators. Downstream of the cyclone separators, a low velocity test section (approximately 30 ft/s) capable of housing 180 pin specimens 1/4' diameter has at three different temperatures ranging from 1300 to 1600 F. Following the cascades of airfoil shaped specimens, six specimens per cascade. This high velocity test section is being used to evaluate the combined effects of erosion and corrosion on the degradation of gas turbine materials at gas velocities of 800 to 1400 ft/s. The materials selection and materials exposure test plan for the long term materials test are summarized. DOE

N82-33517# Hanford Engineering Development Lab., Richland, Wash.
EFFECT OF SPECIMEN SIZE ON THE FRACTURE TOUGHNESS OF TYPE 304 STAINLESS STEEL Interim Report
W. J. Mills Feb. 1982 38 p refs
(Contract DE-AC06-76FF-02170)
(DE82-012517; HEDL-TME-81-52) Avail: NTIS HC A03/MF A01

The effect of specimen size on the elastic-plastic fracture toughness behavior of Type 304 stainless steel was characterized by the multiple specimen J-R curve technique at 4270 C. Fracture tests were performed on five compact specimen sizes: 2.5T (thickness = 63.5 mm), 2.5T (thickness = 14.7 mm), 1T (thickness = 25.4 mm), 1T (thickness = 14.7 mm), and 0.577 (thickness = 14.7 mm). In comparison with the 63.5 mm thick 2.5T specimen results, the smaller specimens exhibited higher J/sub Ic values and lower R curve slopes (dJ/da). However, the differences in J/sub Ic/ and dJ/da were not statistically significant for the 2.5T and 1T specimens, which suggests that size effects for 1T and larger specimens are relatively small or nonexistant. On the other hand, there was a statistical difference between the 0.577T and 2.5T J/sub Ic/ values. DOE

N82-33518# Bureau of Mines, Albany, Oreg. Research Center.
SOLVENT EXTRACTION OF NICKEL AND COPPER FROM LATERITE-AMMONIACAL LEACH LIQUORS Report of Investigations, 1982
D. N. Nilsen, R. E. Siemens, and S. C. Rhoads Jan. 1982 35 p refs
(PB82-176587; BM-RI-8605) Avail: NTIS HC A03/MF A01 CSCL 11F

A solvent extraction system was investigated for the extraction of nickel and copper, followed by the separation and production of suitable electrolytes. Nickel and copper were coextracted from ammoniacal ammonium sulfate leach liquors with LIX 64N extractant in a laboratory-size mixer-settler continuous circuit. Three extraction stages resulted in > 99-pct extraction of nickel, substantial copper extraction, and essentially no cobalt extraction from leach liquors. A crowd stage reduced the ammonia loading on the solvent by maximizing nickel loading. Residual ammonia was removed from the loaded solvent with a pH-controlled scrub. Nickel and copper loaded on the solvent were separated by selective stripping. Typical nickel strip circuit operation using electrolyte containing 90 grams per liter (g/l) Ni and 11.9 g/l H2SO4 yielded > 99.9 pct Ni stripped from the solvent in five stages. Author (GRA)

N82-33519# Bureau of Mines, Albany, Oreg.
ZIRCONIUM OXIDE MOLDS FOR SMALL MOLYBDENUM INVESTMENT CASTINGS
E. D. Calvert and H. W. Leavenworth, Jr. Mar. 1982 33 p refs
(PB82-202995; BM-RI-8624) Avail: NTIS HC A03/MF A01 CSCL 11F

An investment shell molding technique that can be used to make castings of molybdenum and its alloys was developed. The mold material is cubic ZrO2 with a monoclinic ZrO2 binder. The shell, formed by standard investment molding techniques is prepared for molybdenum casting by firing for 6 hours at 1,550 C (2,822 F) or for 4 hours at 1,650 C (3,002 F). The resulting castings have predictable and reproducible dimensions with good detail. As-cast strength is poorer than the strength of wrought materials below 1,600 F. At and above this temperature, tensile strengths of cast and wrought materials are nearly equal. Aqueous corrosion of the castings in most media is insignificant. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-33520* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
METHOD FOR REPAIR OF THIN GLASS COATINGS Patent
Jack W. Holt (Rockwell International Corp., Downey, Calif.), Donald D. Helman (Rockwell International Corp., Downey, Calif.), and Laurence W. Smiser (Rockwell International Corp., Downey, Calif.) Issued 18 May 1982 6 p Filed 25 Jul. 1980 Supersedes N82-26369 (20 - 17, p 2367) Sponsored by NASA
(NASA-Case-KSC-11097-1; US-Patent-4,330,572; US-Patent-Appl-SN-172100; US-Patent-Class-427-140; US-Patent-Class-427-372.2; US-Patent-Class-427-397.7) Avail: US Patent and Trademark Office CSCL 11B

A method of repairing cracks or damaged areas in glass, in particular, glass coatings provided on tile. The method includes removing the damaged area using a high speed diamond burr drilling out a cavity that extends slightly into the base material of the tile. All loose material is then cleaned from the drilled out cavity and the cavity is filled adjacent the upper surface of the coating with a filler material including chopped silica fibers mixed with a binder. The filler material is packed into the cavity and a repair coating is applied by means of a brush or sprayed thereover. The repair includes borosilicate suspended in solution. Heat is applied at approximately 2100 F. for approximately five minutes for curing the coating, causing boron silicide particles of the coating to oxidize forming a very fluid boron-oxide rich glass which reacts with the other frits to form an impervious, highly refractory layer.
Official Gazette of the U.S. Patent and Trademark Office

N82-33521* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SURFACE TEXTURING OF FLUOROPOLYMERS Patent
Bruce A. Banks, Michael J. Mirtich, and James S. Sovey, inventors (to NASA) Issued 17 Aug. 1982 5 p Filed 19 Dec. 1980
(NASA-Case-LEW-13028-1; US-Patent-4,344,996; US-Patent-Appl-SN-218588; US-Patent-Class-428-141; US-Patent-Class-204-38B; US-Patent-Class-204-192E; US-Patent-Class-204-192EC) Avail: US Patent and Trademark Office CSCL 11G

A method is disclosed for improving surface texture for adhesive bonding, metal bonding, substrate plating, decal substrate preparation, and biomedical implant applications. The surface to be bonded is dusted in a controlled fashion to produce a disbursed layer of fine mesh particles which serve as masks. The surface texture is produced by impinging gas ions on the masked surface. The textured surface takes the form of pillars or cones. The bonding material, such as a liquid epoxy, flows between the pillars which results in a bond having increased strength. For bonding metals a thin film of metal is vapor or sputter deposited onto the textured surface. Electroplating or electroless plating is then used to increase the metal thickness in the desired amount.
Official Gazette of the U.S. Patent and Trademark Office

N82-33522*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OVERLAY METALLIC-CERMET ALLOY COATING SYSTEMS Patent Application
Michael A. Gedwill, Stanley R. Levine, and Thomas K. Glasgow, inventors (to NASA) Filed 30 Jul. 1982 11 p
(NASA-Case-LEW-13639-1; US-Patent-Appl-SN-403378) Avail: NTIS HC A02/MF A01 CSCL 11G

A substrate, such as as a turbine blade, vane, or the like, which is subjected to high temperature use is coated with a base coating of an oxide dispersed, metallic alloy (cermet). A top coating of an oxidation, hot corrosion, erosion resistant alloy of nickel, cobalt, or iron is then deposited on the base coating. A heat treatment is used to improve the bonding. The base coating serves as an inhibitor to interdiffusion between the protective 10 top coating and the substrate. Otherwise, the protective top coating would rapidly interact detrimentally with the substrate and degrade by spalling of the protective oxides formed on the outer surface at elevated temperatures. NASA

N82-33523*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
HIGH PERFORMANCE CHANNEL INJECTION SEALANT INVENTION ABSTRACT Patent Application
Robert W. Rosser, Danute I. Basiulis (Hughes Aircraft Co.), and Darrell P. Salisbury, inventors (to NASA) (Hughes Aircraft Co.) Filed 30 Jul. 1982 21 p
(Contract NAS2-10334)
(NASA-Case-ARC-14408-1; US-Patent-Appl-SN-403371) Avail: NTIS HC A02/MF A01 CSCL 11A

High performance channel sealant is based on NASA patented cyano and diamidoximine-terminated perfluoroalkylene ether prepolymers that are thermally condensed and cross linked. The sealant contains asbestos and, in its preferred embodiments, Lithofrax, to lower its thermal expansion coefficient and a phenolic metal deactivator. Extensive evaluation shows the sealant is extremely resistant to thermal degradation with an onset point of 280 C. The materials have a volatile content of 0.18%, excellent flexibility, and adherence properties, and fuel resistance. No corrosibility to aluminum or titanium was observed. NASA

N82-33524*# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
RAPID QUENCHING EFFECTS IN PVC FILMS
H.-D. Lee, J. F. Mandell, and F. J. McGarry Oct. 1981 73 p refs Sponsored by NASA
(NASA-CR-169350; NAS 1.26:169350; MIT-R81-5) Avail: NTIS HC A04/MF A01 CSCL 11B

Using a specially constructed microbalance for hydrostatic weighing, density changes in PVC thin films (with no additives, 30-100 micrometers thick), due to rapid quenching (approximately 300 C/sec) through the glass transition temperature, have been observed. The more severe the quench, the greater is the free volume content. Isobaric volume recovery of PVC has also been studied by volume dilatometry. Both show aging of relaxing molecular rearrangements takes place as a linear function of logarithmic aging time at room temperature. Distribution of retardation times and Primak's distributed activation energy spectra have been applied to the volume recovery data. The concomitant changes in mechanical properties of PVC after quenching have been monitored by tensile creep and stress-strain to failure. All reflect the presence of excess free volume content, due to rapid quenching. Author

N82-33525*# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
FINITE ELEMENT MODELING OF NONISOTHERMAL POLYMER FLOWS
David Roylance 14 Aug. 1981 21 p refs Presented at the ACS Sym. Ser. Computer Appl. in Coatings and Plastics Sponsored by NASA and Army Materials and Mechanics Research Center
(NASA-CR-169355; NAS 1.26:169355; RR-R81-3) Avail: NTIS HC A02/MF A01 CSCL 11G

A finite element formulation designed to simulate polymer melt flows in which both conductive and convective heat transfer are important is described, and the numerical model is illustrated by means of computer experiments using extruder drag flow and entry flow as trial problems. Fluid incompressibility is enforced by a penalty treatment of the element pressures, and the thermal convective transport is modeled by conventional Galerkin and optimal upwind treatments. S.L.

N82-33526# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.
CHARACTERIZATION AND EVALUATION OF RE-REFINED ENGINE LUBRICATING OIL Interim Report, Oct. 1979 - Sep. 1981
Edwin A. Frame and Karen B. Kohl Dec. 1981 86 p refs

Sponsored in part by NBS
(Contracts DAAK70-80-C-0001; DAAK70-82-C-0001; DA Proj. 1L7-62733-AH-20)
(AD-A118573; SwRI-6800-299; AFLRL-152) Avail: NTIS HC A05/MF A01 CSCL 11/8

Additional data base data was sought on the comparative performance of re-refined and virgin oils. The potential substantial equivalence of re-refined and virgin lubricating oils was studied. The development of an engine deposit removal, recovery, and analysis methodology was undertaken. This methodology was used to compare engine deposits derived from virgin and re-refined oils. The effects of virgin and re-refined oils on engine blowby composition and engine deposit generation were determined using a spark ignition engine. Basestock consistency was compared. R.J.F.

N82-33527*# Surface Analytic Research, Inc., Mountain View, Calif.
DYNAMIC MECHANICAL ANALYSIS AND ORGANIZATION/ STORAGE OF DATA FOR POLYMETRIC MATERIALS
M. Rosenberg and W. Buckley Jun. 1982 55 p refs
(Contract NAS2-10803)
(NASA-CR-166413; NAS 1.26:166413) Avail: NTIS HC A04/MF A01 CSCL 11C

Dynamic mechanical analysis was performed on a variety of temperature resistant polymers and composite resin matrices. Data on glass transition temperatures and degree of cure attained were derived. In addition a laboratory based computer system was installed and data base set up to allow entry of composite data. The laboratory CPU termed TYCHO is based on a DEC PDP 11/44 CPU with a Datatrieve relational data base. The function of TYCHO is integration of chemical laboratory analytical instrumentation and storage of chemical structures for modeling of new polymeric structures and compounds J.D.

N82-33528*# Surface Analytic Research, Inc., Mountain View, Calif.
QUANTUM CHEMICAL CALCULATIONS FOR POLYMERS AND ORGANIC COMPOUNDS
J. Lopez and C. Yang 1982 51 p refs
(Contract NAS2-10789)
(NASA-CR-166414; NAS 1.26:166414) Avail: NTIS HC A04/MF A01 CSCL 11C

The relativistic effects of the orbiting electrons on a model compound were calculated. The computational method used was based on 'Modified Neglect of Differential Overlap' (MNDO). The compound tetracyanoplatinate was used since empirical measurement and calculations along 'classical' lines had yielded many known properties. The purpose was to show that for large molecules relativity effects could not be ignored and that these effects could be calculated and yield data in closer agreement to empirical measurements. Both the energy band structure and molecular orbitals are depicted. B.W.

N82-33529# National Research Council of Canada, Ottawa (Ontario). Inst. for Scientific and Technical Information.
THE PROBLEM OF ENSURING A SPECIFIED MOLECULAR WEIGHT IN THE PROCESS OF EMULSION POLYMERIZATION
T. Ya. Lazareva and T. A. Gevorkova 1982 11 p refs Transl. into ENGLISH from Teor. Osnovy Khim. Tekhn. (USSR), v. 15, no. 1, 1981 p 41-45
(NRC/CNR-TT-2026; ISSN-0077-5606) Avail: NTIS HC A02/MF A01

A mathematical model for assuring the quality of the copolymer derived in emulsion polymerization is presented. The process of emulsion polymerization is optimized in order to ensure that it is governed by the law that the molecular weight of the copolymer changes as a function of conversion. An algorithm permitting control of the dosage of the modifier in order to obtain a given molecular weight is derived. The solution of this problem for the case of the continuous process of emulsion copolymerization in a chain of isothermal vessels with ideal mixing is presented. the controlling variable is the concentration of the distributed make up feed, which is calculated by the analytical method. J.D.

N82-33530*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARC-TPI: A MULTI-PURPOSE THERMOPLASTIC POLYIMIDE
Anne K. St.Clair and Terry L. St.Clair Jun. 1982 25 p refs Presented at the 26th Natl. SAMPE Symp., Los Angeles, Apr. 1981
(NASA-TM-84516; NAS 1.15:84516) Avail: NTIS HC A02/MF A01 CSCL 11G

A linear thermoplastic polyimide, LARC-TPI, was characterized and developed for a variety of high temperature applications. In its fully imidized form, this material can be used as an adhesive for bonding metals such as titanium, aluminum, copper, brass, and stainless steel. LARC-TPI was evaluated as a thermoplastic for bonding large pieces of polyimide film to produce flexible, 100 void-free laminates for flexible circuit applications. The development of LARC-TPI as a potential molding powder, composite matrix resin, high temperature film and fiber is also discussed. Author

N82-33531# Dayton Univ., Ohio.
ACETYLENE TERMINATED SULFONE RESIN DEVELOPMENT Final Technical Report, May 1980 - Jan. 1982
Richard P. Chartoff, D. Robert Askins, John Mann Butler, and Daniel Miljer Wright-Patterson AFB, Ohio AFWAL Apr. 1982 125 p refs
(Contract F33615-80-C-5029; AF Proj. 2419)
(AD-A117243; UDR-TR-82-71; AFWAL-TR-82-4046) Avail: NTIS HC A06/MF A01 CSCL 11/9

The object of this program was to determine the potential for forming highly reproducible acetylene terminated sulfone (ATS) resin matrix composites. A 450 lb. batch of ATS was synthesized by Gulf R&D Corp. using a newly developed scale-up procedure. A complete characterization of the physical, mechanical, and thermal properties of the cured resin were carried out. Cure optimization and processing parameter determinations were completed and preferred processing cycles were defined for ATS prepreg and laminates. Finally, mechanical property evaluation were carried out on test laminates produced by the preferred processing methods. Author (GRA)

N82-33532# De Soto, Inc., Des Plaines, Ill.
WATERBORNE POLYMERIC FILMS Final Report, 15 Sep. 1980 - 15 Sep. 1981
A. J. Tortorello and M. A. Kinsella Wright-Patterson AFB, Ohio AFWAL Mar. 1982 60 p refs
(Contract F33615-78-C-5096; AF Proj. 2422)
(AD-A116857; AFWAL-TR-82-4023) Avail: NTIS HC A04/MF A01 CSCL 11/3

The development of an aqueous polymer to function as the pigment binding vehicle for aircraft coatings was conducted. The third and final phase of effort was dedicated to synthesis and formulation of novel polymers to demonstrate the use of the solubility parameter design concept. The preferred system was identified as cationic polyurethane dispersions blended with epoxy resin crosslinking agents. Previous studies have identified a polyurethane of toluene diisocynate and a hydantoin diol as displaying excellent fluid resistance but poor flexibility. Evaluation of several hydroxy-terminated prepolymers for introduction of flexibility into this fluid resistance urethane provided a caprolactone polyester as the prepolymer of choice. GRA

N82-33533# Naval Weapons Center, China Lake, Calif. Research Dept.
SYNTHESIS AND CHARACTERIZATION OF NEW INSENSITIVE HIGH ENERGY POLYNITRAMINE COMPOUND, 2,4,8,10-TETRANITRO-2,4,8,10-TETRAAZASPIRO (5.5) UNDECANE (TNSU) Interim Report, Dec. 1980 - Oct. 1981
Rodney L. Willer Mar. 1982 16 p refs
(AD-A116832; NWC-TP-6353) Avail: NTIS HC A02/MF A01 CSCL 07/3

The synthesis and preliminary characterization of a new high-energy, high-density polynitramine compound, 2,4,8,10-tetranitro-2,4,8,10-tetraazaspiro (5.5) undecane is described.
Author (GRA)

N82-33534# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Coatings and Thermal Protective Materials Branch.
ADVANCED CARBON FABRIC/PHENOLICS FOR THERMAL PROTECTION APPLICATIONS Final Report, 1 Sep. 1980 - 1 Aug. 1981
Donald L. Schmidt and Robert D. Craig Feb. 1982 76 p refs Presented at the 26th Natl. SAMPE Symp. and Exhibition, Los Angeles, 28-30 Apr. 1981
(AF Proj. 2417)
(AD-A116829; AFWAL-TR-81-4136) Avail: NTIS HC A05/MF A01 CSCL 11/5

Carbon fibers are widely used in ablative and thermal insulating applications because of their low conductivity, dimensional stability and strength at very high temperatures, flexibility, low cost and nonmelting characteristics. For over two decades, these carbonaceous fibers have been manufactured from precursor rayon in continuous form. Recent attention has been focused on the precursor polyacrylonitrile because of its high carbon content, low cost, availability in various filament count yarns and tows, and ease of conversion to high-strength carbon fibers. Author (GRA)

N82-33535# Washington State Univ., Pullman. Dept. of Physics.
FRACTO-EMISSION FROM POLYMERS Annual Technical Report, Jun. 1981 - Jun. 1982
J. Thomas Dickinson 21 Jun. 1982 82 p refs
(Contract N00014-80-C-0231)
(AD-A116786) Avail: NTIS HC A05/MF A01 CSCL 11/9

Progress in the investigation of fracto-emission (FE) from polymers is reported. Measurements characterizing the FE, experiments concerning FE mechanisms, and studies of factors influencing FE are discussed. This work includes: an examination of FE accompanying adhesive failure, the crack velocity dependence of electron emission from the fracture of elastomers, experiments to measure the mass-to-charge ratio of the positive ion emission, time correlation measurements of the electron and positive ion emission, and the detection of charge particle emission from the fracture of the molecular crystals PETN and HMX. GRA

N82-33536# National Bureau of Standards, Washington, D.C. Polymer Science and Standards Div.
METHOD OF EVALUATING THE THERMAL STABILITY OF THE PYROELECTRIC PROPERTIES OF POLYVINYLIDENE FLUORIDE EFFECTS OF POLING TEMPERATURE AND FIELD
Danilo DeRossi (Inst. of Physiology, Pisa, Italy), Aime S. DeReggi, Martin G. Broadhurst, Steven C. Roth, and G. Thomas Davis Jun. 1982 32 p refs Submitted for publication
(Contract N00014-79-F-0012)
(AD-A117388; TR-18) Avail: NTIS HC A03/MF A01 CSCL 11/9

The ac pyroelectric response of a number of differently poled polyvinylidene fluoride films has been measured while the temperature was varied at a constant rate of about 5 C/min. from room temperature to near the melting temperature. The response first increases with increasing temperature which is attributed to an increase of the thermal expansion coefficient and eventually decreases due to melting and/or loss of electric dipole orientation. The details of the temperature dependence are influenced in a reproducible manner by the poling variables especially the poling temperature. The measurement is therefore proposed as a way of evaluating the effect of processing variables on the thermal stability of the piezo and pyroelectric properties. Author (GRA)

N82-33537# Northwestern Univ., Evanston, Ill. Dept. of Mechanical and Nuclear Engineering.
MECHANICS OF SURFACE DAMAGE IN ELASTOHYDRODYNAMIC CONTACTS Final Report
Herbert S. Cheng and Leon M. Keer 1 Jun. 1982 23 p refs
(Grant DAAG29-78-G-0199)
(AD-A117458; ARO-16005.3-EG) Avail: NTIS HC A02/MF A01 CSCL 11/8

The first part of the grant was devoted to nearly pure rolling contacts and deals with an analysis of the rate of growth of a surface or a subsurface crack in a two dimensional Hertzian contact with or without tangential force on the surface. This analysis is expected to be used as the basis on which a life prediction model can be formulated. Further analysis developed closed form solutions for problems of three dimensional contact. Explicit expressions in closed form were developed for the subsurface stress field for normal and sliding elliptical contact. The second part of the grant was intended for contacts having a high slide to roll ratio. These contacts usually fail by an accelerated adhesive wear process commonly known as scuffing such as that occurring at the root or tip of gear teeth. Even through the detailed mechanisms of scuffing are yet to be uncovered, there are strong evidences indicating that scuffing failure is of a thermal origin. For this reason, the major part of the second part is focused on a detailed transient analysis of the growth of surface temperature at the asperity tips between two rough sliding EHL contacts. GRA

N82-33538# Case Western Reserve Univ., Cleveland, Ohio. Ultrasonics Research Lab.
COMPRESSIBILITY OF COLLOIDS. 1: COMPRESSIBILITY STUDIES OF AQUEOUS SOLUTIONS OF AMPHIBILIC POLYMERS AND THEIR ADSORBED STATE ON POLYSTYRNE LATEX DISPERSIONS BY ULTRASONIC VELOCITY MEASUREMENTS
M. A. Barrett-Gueltepe, M. E. Gueltepe, and E. B. Yeager 1 Jun. 1982 33 p refs
(Contract N00014-75-C-0557; NR Proj. 384-305)
(AD-A117416; TR-49) Avail: NTIS HC A03/MF A01 CSCL 11/9

Sound velocity measurements were made to obtain compressibility values at 2 MHz, and to investigate the influence of the interface in dispersions of electrostatically stablized dispersions. The measurements were on aqueous dispersions of polystyrene latex as a function of volume concentration up to 49% and temperature up to 80 C (approaching the glass transition temperature), and in solutions of 72.5%, and 78% hydrolyzed polyvinyl alcohol-polyvinyl acetate block copolymers (PVA) as a function of temperature above and below their cloud points. The measurements were extended to latex coated with PVA under conditions known to give a 30 nm layer at room temperature. These dispersions give a resultant compressibility lower than expected from the simple additive effect of the separate components at 25 C and higher. The decrease in compressibility may be due to either or both of two effects: the hydrophobic interaction between the acetate groups and the polymer backbone of the polystyrene latex results in a more rigid structure, and the suppression by the PVA coating of the association-dissociation reaction responsible for the remarkable high adsorption of ultrasound will result in a lower compressibility. Author (GRA)

N82-33539*# Computer Sciences Corp., Bay St. Louis, Miss. Engineering Lab.
FEASIBILITY STUDY: HOLLOW PLASTIC SPHERES TO INCREASE HYDRAULIC FLUID COMPRESSIBILITY Final Report
J. Kotter, B. B. Saunders, J. H. Walker, M. J. Wood, and R. Dombroski Dover, N.J. Army Armament Res. and Develop. Command Jul. 1982 46 p refs
(Contract NAS13-50)
(NASA-CR-169374; NAS 1.26:169374; AD-A117496; AD-E400867; ARLCD-CR-82033) Avail: NTIS HC A03/MF A01 CSCL 11/9

This report documents a study on the feasibility of using sub-micron size hollow plastic spheres as an energy absorbing medium in the fluid of a compressible fluid recoil mechanism for field artillery. The study identifies the properties of a polymer which theoretically will increase the compressibility of a recoil fluid. Author (GRA)

N82-33540# Army Construction Engineering Research Lab., Champaign, Ill.

A METHOD OF POLYMER DESIGN AND SYNTHESIS FOR SELECTIVE INFRARED ENERGY ABSORPTION

Alvin Smith 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117485) Avail: NTIS HC A02/MF A01 CSCL 07/3

The present study presents a procedural method of designing and synthesizing polymers intended to selectively absorb energy in particular bands of the infrared spectrum. Thus, filters may be prepared that can be used to mask or alter the signatures of infrared-emitting objects and, in effect, camouflage these objects against observation by attenuating or altering the infrared energy that is allowed to be transmitted to a detector. In addition to the molecular design of the polymer, a change in the physical form by foaming is studied to determine this effect on the overall efficiency of the attenuating properties of the filter. An advantage of foaming the polymer is the ability to make essentially self-supporting filter enclosures for infrared emitters. The most obvious uses of selectively absorbing infrared filters are in military camouflaging applications and as photographic filters analogous to the visible light filters commonly used. GRA

N82-33541# Cincinnati Univ., Ohio. Dept. of Materials Science and Metallurical Engineering.

STRUCTURE AND PROPERTIES OF POLYMERS AND ORGANOSILANES ADSORBED ONTO OXIDIZED ALUMINUM AND TITANIUM Interim Report, 1 Jul. 1981 - 30 Jun. 1982

F. James Boerio 1 Jul. 1982 35 p refs

(Contract N00014-80-C-0733)

(AD-A117814) Avail: NTIS HC A03/MF A01 CSCL 13/8

The structure of films formed by gamma-aminopropyltriethoxysilane (gamma-APS) adsorbed onto titanium, iron, and aluminum from aqueous solutions was determined and related to the effectiveness of the silane as a primer for improving the hydrothermal stability of metal-to-metal adhesive joints. In all cases gamma-APS was adsorbed as highly hydrolyzed oligomers and then condensed during drying on the metal surface to form siloxxane polymers. However, the oxidized surfaces of aluminum and, to a slight extent, iron were etched in aqueous solutions of gamma-APS at pH 10.4, resulting in the inclusion of metal ions in the adsorbed films. Some evidence for the formation of aluminosiloxane polymers during adsorption of gamma-APS onto aluminum substrates at pH 10.4 was obtained. GRA

N82-33542# Carnegie-Mellon Univ., Pittsburgh, Pa.

PHYSICAL-CHEMICAL PROPERTIES OF ARTICULATED ROD-LIKE POLYMERS Annual Report, Mar. 1980 - Feb. 1981

G. C. Berry, C. C. Lee, Y. Einaga, and R. Furukawa Wright-Patterson AFB, Ohio AFWAL Oct. 1981 183 p refs

(Contract F33615-79-C-5034; AF Proj. 2419)

(AD-A117904; AFWAL-TR-81-4092) Avail: NTIS HC A09/MF A01 CSCL 07/3

Investigation on solutions of rodlike poly(p.phenylene benzobisthiozole), PBT, and articulated modification of PBT and poly (p.phenylene benzobisoxazole), PBO, are reported in three parts: dilute solution characterization of PBT and articulated PBO and PBT copolymers; rheological and rheo-optical studies on concentrated solutions of PBT; and solution processing of PBT into oriented ribbons using an improved version of the Wong-apparatus. In the first section, the effects of interchain association are studied. It is found that each of four articulated PBO copolymers studied is aggregated, even in dilute solution, and that the aggregation of a PBT sample studied depends on its solution/precipitation history. In the second section, the transient behavior leading to steady state flow, and the relaxation subsequent to cessation of flow are studied, with recommendations for solution processing. In the third section, solution processing methods to fabricate well oriented ribbons of PBT are studied, leading to a ribbon with a modulus of 600 g/denier for the specimen with highest modulus. Author (GRA)

N82-33543# Utah Univ., Salt Lake City. Dept. of Materials Science and Engineering.

THE EFFECTS OF PROCESSING CONDITIONS ON THE RELIABILITY OF CROSS-LINKED POLYETHYLENE CABLE INSULATION Progress Report

Paul J. Phillips 1982 20 p refs

(Contract DE-AS02-79ER-10421)

(DE82-011712; DOE/ER-10421/T2) Avail: NTIS HC A02/MF A01

Progress in the determination of the influence of processing on the electrical properties of crosslinked polyethylenes through its effect on morphological variables is reported. Although aimed at an understanding of failure processes in heavy walled insulation, the basic morphological studies are of direct relevance to the many varieties of crosslinked polyethylenes now becoming amongest the most reliable of engineering plastics. There are three basic studies involved, each of which has posed different experimental problems. These areas are: an investigation of the crystallization process in crosslinked polyethylenes using isotropic and strained melts; an investigation of the effect of processing conditions on the morphology of miniature extruded cables; an investigation of the effects of morphological and processing variables on dielectric loss and dielectric breakdown (specifically treeing behavior). DOE

N82-33544# Argonne National Lab., Ill. Solid State Science Div.

EFFECTS OF IONIZATION ON SILICATE GLASSES

William Primak Feb. 1982 41 p refs

(Contract W-31-109-eng-38)

(DE82-012595; ANL-82-7) Avail: NTIS HC A03/MF A01

Radiation effects in silicate glasses caused by ionization are evaluated using experimental data supplemented by a literature search. It is concluded that research into the behavior of silicate glasses generally will be required before the specific effects in the radioactive waste storage glasses can be properly understood and evaluated. Two particular neglected areas of investigation are targeted for immediate concern: a kinetic analysis of annealing data and the acquisition of data on effects of irradiation at controlled elevated temperatures. DOE

N82-33545# Westinghouse Research and Development Center, Pittsburgh, Pa. Insulation Dept.

ULTRAVIOLET-RADIATION-CURABLE PAINTS Final Report, 28 Jun. 1979 - 30 Sep. 1981

A. M. Grosset, W. F. A. Su, and E. Vanderglas 30 Sep. 1982 155 p refs

(Contract DE-AC01-79CS-40210)

(DE82-015717; DOE/CS-40210/T2) Avail: NTIS HC A08/MF A01

In product finishing lines, ultraviolet radiation curing of paints on prefabricated structures could be more energy efficient than curing by natural gas fired ovens, and could eliminate solvent emission. Diffuse ultraviolet light can cure paints on three dimensional metal parts. In the UV curing process, the spectral output of radiation sources must complement the absorption spectra of pigments and photoactive agents. Photosensitive compounds, such as thioxanthones, can photoinitiate unsaturated resins, such as acrylated polyurethanes, by a free radical mechanism. Newly developed cationic photoinitiators, such as sulfonium or iodonium salts (the so called onium salts) of complex metal halide anions, can be used in polymerization of epoxy paints by ultraviolet light radiation. One coat enamels, topcoast, and primers have been developed which can be photoinitiated to produce hard, adherent films. This process has been tested in a laboratory scale unit by spray coating these materials on three dimensional objects and passing them through a tunnel containing UV lamps. DOE

N82-33546# Texas Technological Univ., Lubbock. Inst. for Disaster Research.

THE STRENGTH OF WEATHERED WINDOW GLASS USING SURFACE CHARACTERISTICS Final Report

Jean Jamil Abiassi Aug. 1981 125 p refs

(Grant NSF PFR-77-24063)
(PB82-172735; TTU/IDR-61D; NSF/CEE-81084) Avail: NTIS HC A06/MF A01 CSCL 11B

The strength of glass plates that have been in service as windows for several years is evaluated. Analytical techniques were used to quantify the degrees of strength degradation within several difference in-service window glass samples. A discussion of current window glass design charts, a review of previous work done on the subject, an outline of the research plan, descriptions of the test facility and test plan, and test results are presented. The weathered glass was found to be significantly weaker than the new glass tested; surface strength parameters were shown to be related to the strength of glass plates; and a failure prediction model was shown to be effective in representing the strength of glass plates in terms of surface characteristics. GRA

N82-33547# Texas Technological Univ., Lubbock. Inst. for Disaster Research.
NONLINEAR ANALYSIS OF RECTANGULAR GLASS PLATES BY FINITE DIFFERENCE METHODS Final Report
C. V. G. Vallabhan and Bob Yao-Ting Wang Jun. 1981 125 p
(Grant NSF PFR-77-24063)
(PB82-172552; IDR-60D; NSF/CEE-81083) Avail: NTIS HC A06/MF A01 CSCL 11B

The development of a mathematical model to analyze thin, rectangular glass plates resting on neoprene gaskets in typical frames and subjected to lateral pressure, and representing wind loading conditions is described. The governing equations and boundary conditions defining the large deflections of the middle plane of the plate are discussed and developed with respect to the Cartesian coordinates X and Y. Approximate techniques of the finite difference method used to determine the deflections and the in-plane stress functions of plates with various boundary conditions are explained. A procedure is presented for solving the finite difference expressions using examples to verify the validity of the approach. Results from the model developed agree well with previous solutions. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-33548# Army Missile Command, Redstone Arsenal, Ala.
LASER INDUCED POLYMERIZATION REACTIONS IN SOLID PROPELLANT BINDERS
O. E. Ayers, B. D. Allan, W. S. Melvin, J. A. Murfree, and W. W. Wharton 18 Jun. 1982 14 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117158) Avail: NTIS HC A02/MF A01 CSCL 20/5

These studies indicate significant enhancement of the polymerization rate of organometallic catalyzed polyol-isocyanate reactions that can be obtained with a Nd:YAG ultraviolet/visible laser. This enhancement is wavelength and catalyst dependent. While the precise mechanism is not known, the photorate enhancement appears to be dependent on the formation of an activated metal-isocyanate complex. With the exception of dibutyltin diacetate, the only additives which gave enhanced photochemical activity at 266, 355, and 532 nm were those organometallic compounds containing iron as the central metal atom. However, not all the iron compounds screened showed photoenhancement under the conditions of the experiments. These investigations indicate the laser can be used to enhance and control urethane formation reaction rates and opens the possibility that, through proper wavelength selection, other compounds may act as photocatalysts in these or other types of reactions. GRA

N82-33549# Nevada Univ., Reno. School of Mines.
THE VAPOR PRESSURE OF SALT (HCl) WATER SOLUTIONS BELOW 0 DEG C Final Report, 1 May 1977 - 30 Nov. 1981
E. Miller Jan. 1982 19 p refs
(Grant AF-AFOSR-3333-77; AF Proj. 2308)
(AD-A117080; AFOSR-82-0517TR) Avail: NTIS HC A02/MF A01 CSCL 07/4

Vapor-liquid equilibria data for hydrochloric acid solutions, composition from 7.07 to 37.24 wt pct HCl at temperatures between O and -40C, saturated with sodium chloride are presented. Solubility and solution densities have also been measured and are reported. Evidence has been obtained for the formation of a solid NaCl hydrate in equilibrium with the saturated solutions in the temperature range of -7 to -25C. Quadrupole mass filter sensitivity factors of water to HCl have been determined experimentally and agree with previous thermodynamic predictions to -4 to + or - 14 pct. Author (GRA)

N82-33550# Southwest Research Inst., San Antonio, Tex. Fuels and Lubricants Research Lab.
RESEARCH ON FIRE-RESISTANT DIESEL FUEL Interim Report, 1 Oct. 1979 - 31 Dec. 1981
W. D. Weatherford, Jr., G. E. Fodor, M. D. Kanakia, D. W. Naegeli, B. R. Wright, and F. W. Schaekel Dec. 1982 154 p refs
(Contracts DAAK70-80-C-0001; DAAK70-82-C-0001; DA Proj. 1L7-62733-AH-20; DA Proj. 1T1-61102-AH-51; DA Proj. 1L2-63104-D-150)
(AD-A117408; AFLRL-145; SwRI-6800-110) Avail: NTIS HC A08/MF A01 CSCL 21/4

When development of aqueous fire-resistant diesel fuel (FRF) was previously reported, it was shown that clear-to-hazy water-in-fuel, diesel fuel micro-emulsions could be prepared and that they exhibit reduced mist flammability and self-extinguishing pool fires at temperatures above the base fuel flash point. It was also demonstrated that unmodified diesel engines start, idle, and run without difficulty on such fuels. Research has been continued to establish compositional requirements for base fuels, surfactants, and water used in FRF formulations. DF-2, DF-1, DF-A, and NATO diesel fuel samples were obtained from refineries, bulk storage, and service stations. Aromatic concentrate (AC) products from various sources were evaluated for use in adjusting the total aromatic ring carbon (TARC) content of FRF formulations. Neat base fuel and AC-containing base fuel TARC effects on microemulsification efficacy were established for water containing various amounts of total dissolved solids and for the amide/amine/soap emulsifier with various levels of total acid number. GRA

N82-33551# Suntech, Inc., Marcus Hook, Pa.
AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL, PART 5 Final Report, 2 Jan. 1979 - 1 Feb. 1982
H. E. Reif, J. P. Schwedock, and A. Schneider Wright-Patterson AFB, Ohio AFWAL Mar. 1982 142 p refs
(Contract F33615-78-C-2024; AF Proj. 2480)
(AD-A117438; AFWAL-TR-82-2087-Pt-5) Avail: NTIS HC A07/MF A01 CSCL 21/4

A computer model of Sun Tech's upgrading concept for converting 100,000 BPSD of raw Occidental shale oil into aviation turbine fuels has been developed. Using economic guidelines provided by the U.S. Air Force, the total liquid product cost when maximizing JP-4 jet fuel was $1.22/gallon; $1.24/gallon when maximizing JP-8 jet fuel; and $1.19/gallon when producing JP-4 plus other fuels. Sensitivity analysis showed that the price of raw shale oil had the greatest impact on total liquid product costs. Author (GRA)

N82-33552# Virginia Inst. of Marine Science, Gloucester Point.
HYDROCARBON FUEL CHEMISTRY: SEDIMENT WATER INTERACTION Final Report, Nov. 1980 - Nov. 1981
W. G. MacIntyre, C. L. Smith, P. O. DeFur, and C. W. Su Tyndall AFB, Fla. Air Force Engineering and Service Center Nov. 1981 61 p refs

(Contract F08635-81-C-0019; AF Proj. 1900)
(AD-A117928; AFESC/ESL-TR-82-06) Avail: NTIS HC A04/MF A01 CSCL 21/4

The objective of this program was to determine the effect of sediments on aqueous solutions of selected Air Force hydrocarbon fuels. Effects of sediment type, organic carbon content, pH, temperature and salinity on interaction of dissolved hydrocarbons with sediment were studied. The results of this work can be used to estimate the role of sediment-hydrocarbon interaction terms in fate models of aqueous systems. GRA

N82-33553# Naval Research Lab., Washington, D. C. Dept. of Physics.
A STUDY OF DETONATION STRUCTURE: THE FORMATION OF UNREACTED GAS POCKETS Interim Report
E. S. Oran, T. R. Young, J. P. Boris, J. M. Picone, and D. H. Edwards 26 Jul. 1982 18 p refs
(RR0130646)
(AD-A117849; NRL-MR-4866) Avail: NTIS HC A02/MF A01 CSCL 21/2

Schlieren photographs of detonations in low pressure H2-O2-Ar mixtures and numerical simulations of propagation detonations have revealed the presence of unreacted pockets of gas behind the shock front - Mach stem structure. These pockets are completely surrounded by burned gas, and they in turn burn more slowly, finally giving their energy to the system. Two dimensional numerical simulations performed to study the development of unburned pockets show that they are peninsulas of cooler material cut off by the collision of two Mach stems or of a Mach stem and the wall. Their presence is observed when there is sufficient decoupling of the reaction zone from the incident shock. These unreacted gas pockets and the associated long induction distance are discussed in terms of possible mechanisms for cell reinitiation, cell generation, and the behavior of detonations near the detonation limits. Author (GRA)

N82-33554# Engineering-Science, Inc., Arcadia, Calif.
VAPOR CONDENSATION CONTROL OF JP-4 EMISSIONS FROM UNDERGROUND STORAGE TANKS AT MARCH AIR FORCE BASE, CALIFORNIA Final Report, Sep. - Oct. 1981
Donald R. Holtz and Lawrence C. Cottone Tyndall AFB, Fla. Air Force Engineering and Services Center May 1982 38 p
(Contract F33615-80-D-4001; AF Proj. 1900)
(AD-A117875; AFESC/ESL-TR-82-01) Avail: NTIS HC A03/MF A01 CSCL 06/8

Three efficiency test runs were conducted on an Edwards Engineering Corporation Hydrocarbon Vapor Recovery Unit Model DE 1000 at the March Air Force Base Panero refueling area on 22 and 23 September and 1 October 1981. The recovery system was installed to control JP-4 vapors displaced from the filling of underground tanks. The purpose of the test was to assess the compliance with South Coast Air Quality Management District Rule 462 specifying minimum efficiencies for vapor condensation systems. Author (GRA)

N82-33555# Materials Research Labs., Ascot Vale (Australia).
EXPLOSIVES INSTRUMENTATION GROUP TRIAL 6/77-PROPELLANT FIRE TRIALS (SERIES 2)
I. J. Walters and A. V. Pleckauskas Nov. 1981 38 p refs
(AD-A117695; MRL-TN-457) Avail: NTIS HC A03/MF A01 CSCL 19/1

A series of fire trails were carried out for the Operational Safety Committee to determine the effect of packaging and containerization on the hazard categorization of AR5401, and by similarity AR2201, when those propellants are subjected to a fuel fire as may be experienced when transported on board ship. Author (GRA)

N82-33556# Sandia Labs., Albuquerque, N. Mex. Initiating and Pyrotechnic Components Div.
EXPLOSIVE-POWDER COMPACTION SYSTEM
Arsenio P. Montoya and Marvin L. Reichenbach Sep. 1981 28 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003134; SAND-80-1872) Avail: NTIS HC A03/MF A01

A pressure control system and a test fixture to study the behavior of explosive materials during compaction are described. Both the pressure control system and the test fixture are self contained and portable. Explosive materials are compacted in a bridged header charge holder assembly by means of a test fixture and a pneumatic cylinder arrangement. Forces are measured with load cells to permit calculation of pressure at the bridgewire powder interface and at the top of the compacted material. Data can be taken during the compaction process. Tests that can be done to characterize the material are: electrothermal response (ETR) as a function of pressure; electrical resistivity; loading ram displacement, and the corresponding applied and transmitted forces (from which pressures can be calculated); and ignition and pressure output characteristics. DOE

N82-33557# Williams Bros. Engineering Co., Tulsa, Okla. Process Div.
ASSESSMENT OF UNDERGROUND COAL GASIFICATION IN BITUMINOUS COALS. VOLUME 1: EXECUTIVE SUMMARY Final Report
1981 117 p
(Contract DE-AC21-80MC-14584)
(DE82-014584; DOE/MC-14584/1193-Vol-1) Avail: NTIS HC A06/MF A01

This report describes the bituminous coal resources of the United Stafes, identifies those resources which are potentially amenable to Underground Coal Gasification (UCG), identifies products and markets in the vicinity of selected target areas, identifies UCG concepts, describes the state of the art of UCG in bituminous coal, and presents three R and D programs for development of the technology to the point of commercial viability. Of the 670 billion tons of bituminous coal remaining in place as identified by the National Coal Data System, 32.2 billion tons or 4.8% of the total are potentially amenable to UCG technology. The identified amenable resource was located in ten states: Alabama, Colorado, Illinois, Kentucky, New Mexico, Ohio, Oklahoma, Utah, Virginia, and West Virginia. The principal criteria which eliminated 87.3% of the resource was the minimum thickness (42 inches). Three R and D programs were developed using three different concepts at two different sites. Open Borehole, Hydraulic Fracture, and Electrolinking concepts were developed. The total program costs for each concept were not significantly different. The study concludes that much of the historical information based on UCG in bituminous coals is not usable due to the poor siting of the early field tests and a lack of adequate diagnostic equipment. DOE

N82-33558# Oklahoma State Univ., Stillwater. Dept. of Chemistry.
CHARACTERIZATION OF COAL-DERIVED LIQUIDS AND OTHER FOSSIL-FUEL-RELATED MATERIALS EMPLOYING MASS SPECTROMETRY Final Report, 30 Sep. 1976 - 29 Sep. 1980
Stuart E. Scheppele May 1982 40 p refs
(Contracts DE-AS01-76ET-10589; EX-76-S-01-2537)
(DE82-015005; DOE/ET-10589/T1) Avail: NTIS HC A03/MF A01

A document was prepared which assessed the state of the art in the mass spectrometric characterization of fossil fuel materials and the relevance of these data to the fossil fuel industry. A Kratos DS50 SM data system was successfully interfaced to a CEC 21-110B mass spectrometer. Communications between the NOVA 3/12 computer in the data system and the OSU central computer were established. A Grant Comparator/Microdensitometer was acquired and made operational. Plans were developed and hardware acquired for interfacing the densitometer to the NOVA 3/12 computer. A quartz direct introduction probe was acquired for the CEC 21-110B. A temperature controller for the probe was acquired and interfaced to the slow speed ADC on the auxiliary board in the data system/mass spectrometer interface. The combined FI/EI source was modified to operate in the FD

mode and an apparatus was fabricated for conditioning FD emitters. A CSI supergrater 3 was interfaced to the PE 3920 gas chromatograph. The upgraded facility was used to develop mass spectrometric methods for the characterization of fossil fuel materials and to apply methods to the characterization of these materials. DOE

N82-33559# Grace (W. R.) and Co., Dallas, Tex.
FEASIBILITY STUDY FOR A COAL-SOURCED METHANOL PROJECT Final Report
29 Jan. 1981 110 p
(Contract DE-FG01-80RA-50313)
(DE82-008137; DOE/RA-50313/1137) Avail: NTIS HC A06/MF A01

The feasibility of constructing a coal-sourced methanol plant in the Axial Basin of northwest Colorado is assessed. An initial module producing about 67 million gallons of methanol per year is considered. The environmental impacts of both the initial and expanded plants are acceptable, and all regulatory requirements can be met. Engineering and financial analysis are sufficiently complete to conclude that the project is economically attractive. Market risks can be minimized by beginning with a small initial module, followed by plant expansions to serve a growing methanol market. DOE

N82-33560# General Atomic Co., San Diego, Calif.
THERMOCHEMICAL WATER-SPLITTING FOR HYDROGEN PRODUCTION Final Report, 1 Jan. 1975 - 31 Dec. 1980
H. J. Norman, G. E. Besenbruch, and D. R. OKeefe Mar. 1981 232 p refs
(GA Proj.)
(PB82-208174; GRI-80/0105; GA-A16300) Avail: NTIS HC A11/MF A01 CSCL 21D

The work on the sulfur iodine water splitting cycle is summarized. The SO2-I2-H2O reaction data is presented. This reaction forms two separable phases: one rich in H2SO4 and (2) the other rich in HI. The H2SO4 phase enhancement by further reaction on contact with I2 and SO2 is described. Catalytic decomposition of vaporized H2SO4 into SO2, H2O, and O2 and recovery of these products was found to be feasible. The conversion using H3PO4 of the HI product phase into the components I2, H2O, and HI is reported. Both gaseous and liquid catalytic conversion of HI were found to be reasonable processes to produce H2. The sulfur iodine water splitting cycle is a leading candidate commercialization with appropriate high quality heat from fission reactors, fusion reactors, and concentrated solar energy. Engineering evaluations have determined the thermal efficiency of the cycle to be approximately 47%. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-33561# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 14, NO. 1 Monthly Report
Judith Nagle-Eshleman, ed. Jan. 1982 125 p refs
(AD-A111336) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Results of work performed in shock and vibration techniques and engineering are presented. The following issues are treated: shock mechanics, vibration tests, mechanical engineering, literature surveys, damping, plastics, fillers, seismic waves, filled plastics, naval research, periodicals, abstracts, and indexes. For individual titles, see N82-33562 through N82-33563.

N82-33562# Stress Technology, Inc., Rochester, N.Y.
THE LITERATURE OF VIBRATION ENGINEERING **c39**
N. F. Rieger *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 14, No. 1 Jan. 1982 p 5-14 refs (For primary document see N82-33561 24-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington D.C. 20375 CSCL 20/11

Available textbooks on mechanical vibrations are reviewed. Books are identified according to their emphasis: fundamentals, applied vibrations, isolation and damping, random vibrations, and testing. E.A.K.

N82-33563# De (Sasadhar), West Bengal (India).
SEISMIC WAVES **c46**
Sasadhar De *In* Shock and Vibration Inform. Center The Shock and Vibration Digest Jan. 1982 p 17-33 refs (For primary document see N82-33561 24-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 08/11

Developments in seismology, mathematical methods to study seismic waves, effects of such waves on ground movement and structures, and prediction of earthquakes are reviewed. Directions for future research are given. E.A.K.

N82-33564# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 14, NO. 2 Monthly Report
Judith Nagle-Eshleman, ed. Feb. 1982 114 p refs
(AD-A111521) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Acoustic measurement methods are reviewed, and assessed as to the most effective method. Membrane vibrations are studied in relation to nonlinear effects, forced vibrations, material anisotropy, and other complicating factors. Band saw vibration and circular saw vibration are discussed. For individual titles, see N82-33565 through N82-33566.

N82-33565# Ohio State Univ., Columbus. Mechanical Engineering Dept.
ACOUSTIC IMPEDANCE MEASUREMENT METHODS **c71**
R. Singh *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 14, No. 2 Feb. 1982 p 3-10 refs (For primary document see N82-33564 24-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/1

Acoustic impedance measurements pose a fundamental measurement problem because, of the two primary variables: acoustic pressure and particle/volume velocity. Only pressure can be measured reliably and accurately in the plane wave regime. Indirect means for measuring acoustic impedances and other characteristics were derived. The most commonly used method is the standing wave tube method. But alternate experimental methods were investigated. Some of these use digital instrumentation. This paper is a critical review and comparative assessment of these measurement methods are reviewed. S.L.

N82-33566# California Univ., Berkeley. Dept. of Mechanical Engineering.
BAND SAW AND CIRCULAR SAW VIBRATION AND STABILITY **c37**
C. D. Mote, Jr., G. S. Schajer, and W. Z. Wu *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 14, No. 2 Feb. 1982 p 19-25 refs (For primary document see N82-33564 24-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 13/9

Band saw vibration and circular saw vibration are studied. The vibration and stability of wide band saw blades were investigated using axially moving plate vibration models, membane stress effects were included. Both classical Ritz and finite element Ritz methods were used. The dependence of natural frequency on band velocity, normal and tangential edge forces, wheel support systems, wheel tilting, thermal gradients in the band, and prestress of the band was numerically investigated. S.L.

N82-33567*# National Aeronautics and Space Administration. Pasadena Office, Calif.

SPHERE FORMING METHOD AND APPARATUS Patent Application

Charles L. Youngberg (JPL, California Inst. of Tech., Pasadena), Charles G. Miller (JPL, California Inst. of Tech., Pasadena), James B. Stephens (JPL, California Inst. of Tech., Pasadena), and Anthony A. Finnerty, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 30 Jul. 1982 16 p

(Contract NAS7-100)
(NASA-Case-NPO-15070-1; US-Patent-Appl-SN-403847) Avail: NTIS HC A02/MF A01 CSCL 13H

Hollow bodies are formed into accurate spheres. A hollow body is dropped through a tube to fall to a position where it is supported on an updraft of hot air issuing from the end of a levitator. The hot air and heat from over walls allow surface tension to spherically form the object. The molten sphere is allowed to fall, by jerking the levitator at a downward incline. The molten sphere falls through a valve and into a drop tower, to cool as it falls. The drop tower contains a vacuum, to avoid distorting the falling sphere. The valve opens for only a brief time (e.g., 1/10th second) to admit the sphere, and then closes, to minimize the inflow of air. At the bottom of the drop tower, an oil bath into which gas has been blown to form a foam is at the bottom of the deep tower. The foam cushions the fall of the sphere. NASA

N82-33568# United States Metric Board, Arlington, Va.

[METRIC CONVERSION IN THE UNITED STATES] Summary Report

Jul. 1982 45 p
Avail: NTIS HC A03/MF A01

A retrospective look at activities concerning metrication in the United States is presented. The issue of metric conversion from the viewpoint of different constitutencies is discussed, and the status of metrication in the Federal government is summarized. S.L.

N82-33569# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

REFERENCE BOOK FOR THE NITROGEN INDUSTRY WORKER IN TWO VOLUMES, VOLUME 1

25 May 1982 747 p refs Transl. into ENGLISH of "Spravochnik Azotchika, Volume 1" Moscow, Khimiya, 1967 p 1-491
(AD-A115651; FTD-ID(RS)T-1464-80-Vol-1) Avail: NTIS HC A99/MF A01 CSCL 07/2

The first volume presents the physical and chemical properties of gaseous and liquid substances used and obtained at the nitrogen industry enterprises. It describes the different methods for producing and purifying production gases (nitrogen-hydrogen mixture, gas synthesis). It examines the physical and chemical properties of the processes of amonia and methanol synthesis, the industrial plans and the principles for automating them. Certain methods are given for technological calculations, characteristics of the catalysts are presented, and the employed equipment is described. It is designed for engineering-technical workers of enterprises of the nitrogen and other sectors of industry, for specialists working in the scientific research and planning institutes, design offices and other organizations, as well as for teachers of higher educational institutions and students specializing in the field of the technology of inorganic products. L.F.M.

N82-33570# Naval Ship Research and Development Center, Bethesda, Md. Ship Performance Dept.

LIFT SYSTEM AND FAN PERFORMANCE OF AIR CUSHION SUPPORTED VEHICLES

D. D. Moran and A. N. Jennings Feb. 1982 39 p refs
(AD-A117363; DTNSRDC/SPD-0695-02) Avail: NTIS HC A03/MF A01 CSCL 01/3

An analysis of the AALC JEFF lift systems and fans from the viewpoints of performance and structural design is performed. A summary of performance data related to the JEFF lift systems is presented, and suggested approaches for JEFF (A) lift fan design, for which these data provided the baseline information, are provided. Published methods of scaling fan performance data from model to full-scale are evaluated. Finally, the structural design characteristics of the JEFF fans are discussed. GRA

N82-33571# Army Armament Research and Development Command, Dover, N. J. Large Caliber Weapon Systems Lab.

A NEW ANALYSIS OF THE UNWINDING RIBBON AS A DELAYED ARMING DEVICE

William P. Dunn 18 Jun. 1982 15 p ref Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117352) Avail: NTIS HC A02/MF A01 CSCL 19/1

The objective of this work was to formulate theoretical methods to enable engineers to design unwinding ribbons for use as delay arming mechanisms with reasonable accuracy and a minimum development effort. The unwinding ribbon considered here is a 'wrapped' spring, which is a spiral spring made from flat metal stock closely wound. In the unstressed condition all the coils of the spring are touching. The results of the analysis are given and compared with the experimental results obtained by T. B. Alfriend. This is a more complete study than that of Alfriend since no assumptions are made concerning the moment of inertia of the coil and hub or the tension force in the ribbon bridge. Hence, two empirical constants in Alfriend's analysis were dropped in favor of exact expressions. GRA

N82-33572# New Jersey Inst. of Tech., Newark. Dept. of Electrical Engineering.

MERCURY CADMIUM TELLURIDE SPUTTERED TARGET RESEARCH ,Final Technical Report

Roy H. Cornely, Lawrence Suchow, and Robert Bourne 29 Jun. 1982 48 p refs
(Grant DAAG29-78-G-0066)
(AD-A117456; ARO-14907.2-PH) Avail: NTIS HC A03/MF A01 CSCL 13/8

Techniques for fabricating large-area targets by pressing either a physical mixture of HgTe and CdTe powder particles (7 micron average size) or a similar-size powder ground from (Hg,Cd)Te polycrystalline ingots were developed. Sixty SEM microphotographs of regions of r.f. triode-sputtered targets, sputtered to different erosion depths, revealed topographical changes and dynamic erosion processes, e.g. cone formation and deterioration. The sputter-protect theory for cone formation due to larger, slow-sputtering particles (10-50 microns) was demonstrated. Distinctly different cone angle distributions for HgTe and CdTe particles were measured; X-ray powder patterns revealed fusion of smaller HgTe and CdTe particles. GRA

N82-33573# National Academy of Sciences - National Research Council, Washington, D. C.

COMPUTER-AIDED MANUFACTURING: AN INTERNATIONAL COMPARISON Final Report

Jozsef Hatvany (Hungarian Academy of Sciences), Keith Rathmill (Cranfield Robotics and Automation Group), and Yoshikawa Hiroyuki (Tokyo Univ., Japan) Jan. 1982 85 p
(Contract F49620-78-C-0027)
(PB82-172321) Avail: NTIS HC A05/MF A01 CSCL 13H

Computer aided manufacturing is discussed. The state of the art, development trends, and a forecast for computer aided manufacturing in Japan and Europe are among the topics covered. Robotics and production engineering are discussed. GRA

N82-33574# Cambridge Univ. (England). Dept. of Engineering.

PRACTICAL APPLICATIONS OF HOT-ISOSTATIC PRESSING DIAGRAMS: FOUR CASE STUDIES

E. Arzt, M. F. Ashby, and K. Easterling (Lulea Univ., Sweden) Oct. 1981 41 p refs
(PB82-182338; CUED/C-MATS/TR-88-1981; ISSN-0309-6505) Avail: NTIS HC A03/MF A01 CSCL 13H

The construction of mechanism-maps for hot isostatic pressing is described. Maps are constructed for a number of materials of commercial and scientific interest: a tool steel, a superalloy, Al2O3 and ice. They allow the processes involved in hot-isostatic pressing to be examined, and suggest ways of picking optimum combinations of pressure, temperature and time to give maximum density. GRA

N82-33575# National Bureau of Standards, Washington, D.C. Center for Building Technology.
DEVELOPMENT OF AN ENERGY TEST METHOD FOR A DEDICATED WATER-HEATING PUMP
C. Andrew Wan, Robert L. Palla, Jr., and James E. Harris Jan. 1982 54 p refs Sponsored in part by DOE and ORNL
(Contract EW-78-I-05-5750)
(PB82-170069; NBSIR-81-2372) Avail: NTIS HC A04/MF A01 CSCL 13A

Modifications of the DOE test procedure for water heaters were made to include a dedicated water heating pump system equipped with a 50 gallon electric water heater tank. Also presented are laboratory tests and results which provided the basis for the test methods used. Tests included determination of recovery efficiency, standby loss, and water heater jacket loss under static or no-draw conditions and a dynamic test in which water is withdrawn according to a 'typical-use' schedule. Energy requirements predicted by the proposed (static) procedure were in good agreement with measured energy consumption for the dynamic test in limited testing. GRA

N82-33576# Electricity Council Research Centre, Capenhurst (England).
SOME PRACTICAL ASPECTS ON THE INFRA-RED THERMOGRAPHY OF BUILDINGS
J. B. Siviour Oct. 1981 23 p refs
(PB82-174517; ECRC/M-1483) Avail: NTIS HC A02/MF A01 CSCL 13A

The use of infra-red thermography to obtain scans of internal and external surface temperatures of houses is described. In general, the interpretation of the pictures in color is straightforward, but there are limitations which have to be understood. When used outside a building, direct and residual effects of the Sun on external surfaces can be significant. Reflection occurs at high angles of incidence, so that for example, when viewing a pitched roof from the ground sunlight may be reflected from the roof into the infrared camera. Also heat from the Sun may be stored in walls for many hours. Inside a building cold spots may be due to the high heat loss from thermal bridges to the outside or to low local heat loss arising from cold air infiltration. GRA

N82-33577# Thermo Electron Corp., Waltham, Mass.
GLASS BATCH PREHEATER: PHASE 2. LABORATORY TESTING Final Report, Aug. 1980 - Aug. 1981
W. E. Cole and N. Veltfort Jan. 1982 117 p refs Sponsored in part by the Southern California Gas Co.
(Contract GRI-5080-342-0399)
(PB82-180639; TE4229-188-82; GRI-82/0001) Avail: NTIS HC A06/MF A01 CSCL 13A

The feasibility of using fluidized bed technology for glass batch preheating was evaluated. This technology provides over a 20% energy reduction, a reduction in air pollution emissions, a reduction in furnace operating temperature (and consequently increased furnace life), as well as less than a two year payback period. Construction and testing of a laboratory scale heat exchanger to investigate the compatibility of the fluidization process with the glass manufacturing process is described. Tests performed have verified: the heat transfer performance; the fluidization characteristics of glass batch; the solids mixing and subsequent reduction of batch segregation; the elutriation characteristics (loss of fine particles); and that no deleterious effects, as indicated by laboratory crucible melts, are introduced by the fluidized bed. GRA

N82-33578# Cambridge Univ. (England). Dept. of Engineering.
CRACKING AND TOUGHNESS OF CONCRETE AND POLYMER-CONCRETE DISPERSED WITH SHORT STEEL WIRES
Peter W. R. Peaumont 1981 52 p refs
(Grants SGP-2-108; SGP-2-35208)
(PB82-180589; CUED/C-MATS/TR-44; ISSN-0309-6505) Avail: NTIS HC A04/MF A01 CSCL 13C

Models for quantitative description of the fracture processes occurring in fiber reinforced brittle solids are discussed. Experimental measurements of cracking stress and toughness for two brittle fibrous composites are compared with the theoretical predictions. The two brittle matrices are concrete and concrete impregnated with polymethyl methacrylate reinforced by discontinuous (short) high strength steel wires. It involved extracting a single steel wire from each brittle matrix to evaluate the debonding stress and pull-out stress as a function of fiber embedded length. These key material parameters and the energetics of cracking determined in three-point flexural experiments, together with the cracking and toughening equations are then used to characterize the fracture behavior of fiber strengthened concrete and polymer-concrete composites. GRA

N82-33579# South Dakota School of Mines and Technology, Rapid City. Dept. of Civil Engineering.
POLYMER CONCRETE AND ITS APPLICATION TO BRIDGE DECK MAINTENANCE Final Technical Report
L. Srinivasa Iyer Sep. 1981 98 p refs Sponsored in part by South Dakota Dept. of Transportation
(PB82-177940; FHWA/SD-80-618) Avail: NTIS HC A05/MF A01 CSCL 13C

Polymer concrete seems to solve the problem to provide fast development of strength and protection against chloride penetration in the bridge deck. A system related to patchwork using polymer concrete with local aggregates was developed and compared with the commercially available materials. The laboratory tests and field performance of the system are described. GRA

N82-33580# New Jersey State Dept. of Transportation, Trenton. Div. of Research and Demonstration.
PAVEMENT ROUGHNESS EVALUATIONS USING A MAYS RIDE METER Final Report
Jack R. Croteau Jun. 1981 113 p refs
(PB82-177841; FHWA/NJ-82/003; REPT-82-003-7776) Avail: NTIS HC A06/MF A01 CSCL 13B

Roughness data on new pavement construction and recent resurfacings is analyzed and an acceptance procedure for resurfacing developed. A high-speed measurement device known as the Mays ride meter was used for much of the roughness testing. The Mays meter consists of instrumentation mounted in a passenger car which measures smoothness in terms of the relative motion between the car body and axle. Smoothness tests performed on new freeways indicate that the overall rideability of our bituminous pavements has improved substantially, a 'Good' rating being typical. Rolling straightedge-based smoothness acceptance provisions were adopted to deal with the isolated instances of unacceptable riding quality which continue to be observed. Data from several new concrete projects indicate a small, yet significant relative improvement in rideability. GRA

N82-33581# Kleinfelder (J. H.) and Associates, Walnut Creek, Calif.
EVALUATION OF TECHNIQUES FOR PREDICTING SOIL LIQUEFACTION AND VERIFICATION OF FIELD TECHNIQUES TO PREDICT IN SITU SHEAR WAVE VELOCITY
Javed S. Chak, Cyril M. McRae, K. Arulanandan (Calif. Univ., Davis), and Allen D. Bailey (Bailey Scientific) Jul. 1981 76 p refs
(Grant NSF PFR-79-18559)
(PB82-168444; K-78-22; NSF/CEE-81080) Avail: NTIS HC A05/MF A01 CSCL 08K

The liquefaction potential for a site near the San Andreas fault was evaluated by the standard penetration test and analytical, strain potential, and electrical methods. Each method examined influences on the liquefaction characteristics of a saturated sand deposit including density, grain structure, and length of time the sand was subjected to sustained pressure. The standard penetration test procedure indicated that a potential for liquefaction existed in the upper 20 feet of the soil strata; below 20 feet, the site was less likely liquefy. Results derived by the other three methods indicated a high potential for liquefaction for the total depth explored. Although the degree of liquefaction varied according to the method used, overall results indicated that the sight will liquefy during an earthquake similar to the 1906 San Francisco earthquake. GRA

N82-33582# West Virginia Univ., Morgantown. Dept. of Mining Engineering.
STRESS DISTRIBUTION AND PILLAR DESIGN IN OIL SHALE RETORTS
Syd S. Peng and Richard E. Thill (Bureau of Mines, Twin Cities, Minn.) Jan. 1982 39 p refs
(PB82-176256; BM-RI-8597; LC-81-607827) Avail: NTIS HC A03/MF A01 CSCL 08I

The design of retort interchamber pillars is important in determining surface stability over in situ retort mines and to the health and safety of miners, particularly with respect to possible escape of heat and toxic gases from retort chambers. Stress distribution in retort interchamber pillars, roof, and floor was examined with the aid of linear, finite-element analysis using data from experimentally determined mechanical properties. Properties determined included elastic moduli, strength, and creep constants in laboratory tests on core covering a 100-foot depth interval in the oil shale from the Piceance Basin in Colorado. The most critical stress concentration was found in the rib side of the interchamber pillar at a height above the floor line of 1.25 times the width. Guidelines for pillar design that consider pillar strength, creep, and retorting temperature effects are proposed. Author

N82-33583# Technical Research Centre of Finland, Espoo. Metal Labs.
WELD THERMAL SIMULATOR
Hans-Ulrich Pfeifer Apr. 1980 34 p refs
(PB82-207283; ISBN-951-38-0965-X; ISSN-035506395) Avail: NTIS HC A03/MF A01 CSCL 13H

The construction of a resistance heated weld thermal simulator unit (135 kVA) is described in detail. The temperature control eliminates effectively all disturbing interferences arising from the heating circuit. Aspects of temperature measurements and of temperature distributions in heated samples are discussed. The reproducibility of the preprogrammed temperature cycles is very good and heating rates up to 1000 K/s can be achieved. The principal application of the unit is the simulation of weld processes in order to study solid state transformations within metallic materials, e.g. the development of heat affected zones.
Author (GRA)

N82-33584# Technical Research Centre of Finland, Espoo. Metals Lab.
COMPARISON BETWEEN SHEAR WAVE ULTRASONIC EXAMINATION AND RADIOGRAPHIC EXAMINATION OF SOME AUSTENITIC STAINLESS STEEL PIPE WELDS
Ari Juva Mar. 1979 29 p
(PB82-207267; ISBN-951-38-0779-7; ISSN-0355-6395; Rept-50) Avail: NTIS HC A03/MF A01 CSCL 13H

The results of the ultrasonic and radiographic examinations of five austenitic pipe-to-pipe welds containing different types of intentional weld defects are compared. Both the ultrasonic and radiographic examinations were made under laboratory conditions, and thus the results cannot directly be generalized to workshop examinations. The ultrasonic examination was performed using a conventional shear wave angle beam technique due to the geometric conditions of the welds. Neither method gives quite satisfactory results. Both methods missed some defects and the correlation between the results of the methods was not very good. In the ultrasonic examination the most difficult problem was the evaluation of the defects. GRA (Author)

N82-33585# Technical Research Centre of Finland, Espoo. Concrete and Silicate Lab.
PROGRAM PACKAGE FOR NONLINEAR ANALYSIS OF REINFORCED CONCRETE STRUCTURES
Matti Pajari Oct. 1980 50 p refs
(PB82-204744; ISBN-951-38-1111-5; ISSN-0357-3737; Rept-76) Avail: NTIS HC A03/MF A01 CSCL 13B

Additions to the computer program ADINA were made with a view to improving the applicability of the program to analyses of reinforced and prestressed concrete structures. These additions anable the modelling of reinforcement by adding the elasticity and stress matrices of reinforcement and concrete together. The parallel reinforcing bars are supposed to make up a layer having stiffness only in the direction of bars of also perpendicularly to the bars. The steel layer passes through the integration points of the elements, where its strain is assumed to be the same as that in concrete. The constitutive law of steel is elastoplastic. The creep law in accordance with the CEB model on creep of concrete was introduced to a thermoelastic plastic material model. It can be used in the analyses of uncracked concrete structures. The 'layer' reinforcement gives the same results in all analyzed structures as those yielded by the truss element reinforcement or handmade calculations. GRA

N82-33586# Transport and Road Research Lab., Crowthorne (England).
PAVEMENT THICKNESS, SURFACE EVENNESS AND CONSTRUCTION PRACTICE
J. C. McLellan 1982 28 p refs
(PB82-202599; TRRL-Suppl-706; ISSN-1305-1315) Avail: NTIS HC A03/MF A01 CSCL 13B

The structural performance and the riding quality of a road are strongly influenced by the accurate and uniform laying of the pavement materials to the appropriate design thickness. The effectiveness of level control procedures used in road construction to achieve the required thicknesses and surface regularity is investigated. Surface profile and of thickness of pavement were measured during construction on 38 randomly selected 100-meter lengths from two flexible and three rigid roads. Measurements analysis showed that the mean layer thicknesses were generally at or near the required thickness but that layer thickness varied considerably along the test lengths, particularly for the concrete pavements. On flexible roads, the results showed that the profiles of the lower layers influenced the evenness of the finished surface. On rigid construction the evenness of the finished surfaces was independent of the profile of the subbase. GRA

N82-33587# Federal Highway Administration, Sacramento, Calif.
PROOF TESTING OF A STRUCTURAL PLATE PIPE WITH VARYING BEDDING AND BACKFILL PARAMETERS. SECTION 7, VOLUME 1: FINITE ELEMENT ANALYSIS PROGRAM MODIFICATION AND ANALYSIS OF ZONE 2 Interim Report
Jon Lea, R. E. Davis, and A. E. Bacher Jun. 1981 451 p refs Sponsored by DOT
(PB82-201526; FHWA/CA/SD-81/05) Avail: NTIS HC A20/MF A01 CSCL 13B

The verification of modifications to the REA computer coded program for the time element analysis of reinforced Earth installations permitting its application to culverts embedded in earth embankments is described. As a means of verifying the modifications, the revised program was applied to a cross section of the embankment at Zone 2 of the DB Culvert, a heavily instrumented 120 in (3048 mm) structural plate pipe. The influences of: (1) boundary conditions; (2) soil culvert relative movements; and, (3) soil types are examined. Correlations are established between quasitheoretical parameters derived from the program application and field measured values of these parameters where reduced data are available. Other quasitheoretical parameters are examined. Author

N82-33588# Virginia Highway and Transportation Research Council, Charlottesville.
DESIGN OF OVERLAYS BASED ON PAVEMENT CONDITION, ROUGHNESS, AND DEFLECTIONS Final Report
K. H. McGhee Jan. 1982 46 p refs Sponsored by DOT
(PB82-201369; FHWA/VA-82/31) Avail: NTIS HC A03/MF A01 CSCL 13B

The development and use of a pavement maintenance rating system and the development of two procedures for designing the thickness of overlays are summarized. It is demonstrated that objective rating systems can be used to prioritize pavements scheduled for resurfacing and that the procedures for overlay design based on the existing pavement structure and on traffic loadings are practical. Author

N82-33589# New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
THE CATSKILL-CAIRO EXPERIMENTAL RIGID PAVEMENT: A TEN-YEAR PROGRESS REPORT Interim Report
John M. Vyce and Richard G. Phillips Jul. 1981 22 p refs
(Research Proj. 25-2)
(PB82-201229; FHWA/NY/RR-81/91; RR-91; IR-4) Avail: NTIS HC A02/MF A01 CSCL 13B

The Catskill-Cairo experimental rigid pavement, open to traffic for over 10 years, shows very little change in condition. Test sections include 60-ft 10-in. slab lengths reinforced with mesh and containing load-transfer devices, 20-ft slab lengths with no mesh reinforcement but both with and without load-transfer devices, and three types of base material. All sections are in good condition, with little added roughness, little faulting, and light cracking. More important, there are no significant differences in performance of the various designs. The lack of distress and performance differences among the various designs is most likely due to the light traffic volumes carried by the test road. This situation led to the conclusion that none of the design alternatives can be eliminated based on performance of this test road after 10 years.
Author

N82-33590# Connecticut Dept. of Transportation, Wethersfield.
PLACEMENT OF AN EXPERIMENTAL HEATER-SCARIFIED IN-PLACE RECYCLED PAVEMENT Construction Report, Jun. - Aug. 1981
K. R. Lane Nov. 1981 85 p
(PB82-197237; FHWA/CT/RD-647-2-81-14; HPR-647) Avail: NTIS HC A05/MF A01 CSCL 13C

An in-place, heater-scarified, recylced bituminous pavement was constructed on a section of Route 15, Westport, Connecticut. The construction activities are described. Also addressed are environmental and economical analyses for this process compared to the conventional method.
GRA

N82-33591# Florida Univ., Gainesville. Marine Advisory Program.
COASTAL CONSTRUCTION PRACTICES
Christopher P. Jones, ed. and Leigh Taylor Johnson, ed. Jan. 1982 25 p
(Grant NOAA-NA80-AA-D-00038)
(PB82-201062; NOAA-82032213; MAP-23) Avail: NTIS HC A02/MF A01 CSCL 13M

During recent years various regulations have been implemented to protect Florida's coastal areas. The studies and regulaticns address two basic problems encountered in coastal areas: (1) minimizing structural damage to new construction from wind, surge and wave forces during storms; and (2) protecting existing construction against these same forces. New construction dan, for the most part, be designed to resist hurricane forces, using existing building codes, flood insurance regulations, setback line requirements and other available design guidance. Because many existing buildings were not designed with these requirements and guidance, they cannot be rendered as storm resistant as new buildings. However, shore protection structures can be used to prevent a major cause of structural damage and collapse, namely foundation failure.
GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N82-33592*# Dartmouth Coll., Hanover, N.H. School of Engineering.
A TWO-COMPONENT RAIN MODEL FOR THE PREDICTION OF ATTENUATION AND DIVERSITY IMPROVEMENT Final Report
Robert K. Crane Feb. 1982 85 p refs Prepared for Environmental Research and Technology, Inc., Lexington, Mass.
(Contract NASw-3506)
(NASA-CR-169198; NAS 1.26:169198) Avail: NTIS HC A05/MF A01 CSCL 20N

A new model was developed to predict attenuation statistics for a single Earth-satellite or terrestrial propagation path. The model was extended to provide predictions of the joint occurrences of specified or higher attenuation values on two closely spaced Earth-satellite paths. The joint statistics provide the information required to obtain diversity gain or diversity advantage estimates. The new model is meteorologically based. It was tested against available Earth-satellite beacon observations and terrestrial path measurements. The model employs the rain climate region descriptions of the Global rain model. The rms deviation between the predicted and observed attenuation values for the terrestrial path data was 35 percent, a result consistent with the expectations of the Global model when the rain rate distribution for the path is not used in the calculation. Within the United States the rms deviation between measurement and prediction was 36 percent but worldwide it was 79 percent.
Author

N82-33593*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND APPARATUS FOR SELF-CALIBRATION AND PHASING OF ARRAY ANTENNA Patent Application
Chialin Wu, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 30 Jul. 1982 22 p
(Contract NAS7-100)
(NASA-Case-NPO-15920-1; US-Patent-Appl-SN-403848) Avail: NTIS HC A02/MF A01 CSCL 09C

A central feed broadcasts a continuous and coherent wave from a transmitter to array elements through radiation electronics. Return electromagnetic wave energy is received from each element by a synchronous receiver through a circulator, either by leakage of energy from a power amplifier through a circulator to a receiver amplifier coupled to a reciprocal phase shifter by a directional coupler in one mode, or from a short circuit switch in another mode. The phase shifters are assumed to be set for a pre-computed array pattern for a predetermined array structure. A phase controller advances the phase angles for the phase shifters at different rates in order to introduce a distinct frequency modulation of the returned energy for each array element. The composite return energy is coherently demodulated by a Fourier transform processing system, the output of which corresponds to the response of the array elements. The phase compensation required for each antenna element to achieve the precomputed array pattern is then derived from its response by the phase controller.
NASA

N82-33594*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SHUTTLE STS-2 MISSION COMMUNICATION SYSTEMS RF COVERAGE AND PERFORMANCE PREDICTIONS. VOLUME 1: ASCENT
James A. Porter, J. S. Gibson (Lockheed Engineering and Management Services Co., Houston Tex.), Q. D. Kroll (Lockheed Engineering and Management Services Co., Houston Tex.), and Y. C. Loh (Lockheed Engineering and Management Services Co., Houston Tex.) 5 Oct. 1981 108 p refs
(NASA-TM-84853; JSC-17625-Vol-1; NAS 1.15:84853) Avail: NTIS HC A06/MF A CSCL 17B

The RF communications capabilities and nominally expected performance for the ascent phase of the second orbital flight of the shuttle are provided. Predicted performance is given mainly in the form of plots of signal strength versus elapsed mission time for the STDN (downlink) and shuttle orbiter (uplink) receivers for the S-band PM and FM, and UHF systems. Performance of the NAV and landing RF systems is treated for RTLS abort, since in this case the spacecraft will loop around and return to the launch site. NAV and landing RF systems include TACAN, MSBLS, and C-band altimeter. Signal strength plots were produced by a computer program which combines the spacecraft trajectory,

antenna patterns, transmit and receive performance characteristics, and system mathematical models. When available, measured spacecraft parameters were used in the predictions; otherwise, specified values were used. Specified ground station parameter values were also used. Thresholds and other criteria on the graphs are explained. A.R.H.

N82-33595# Committee on Government Operations (U. S. House).
INTERNATIONAL SHORTWAVE BROADCASTING AND DIRECT BROADCAST SATELLITES: VOICE OF AMERICA, RADIO FREE EUROPE/RADIO LIBERTY, RADIO MARTI
Washington GPO 1981 29 p refs Rept. presented by the Comm. on Govt. Operations, 97th Congr., 1st Sess., 11 Dec. 1981
(H-Rept-97-398; GPO-87-473) Avail: US Capitol, House Document Room

The resource needs of the international shortwave broadcasting organizations are considered, and the potential of direct broadcast satellites are evaluated. The situation facing international radio broadcasters in terms of resources and needs is discussed, and the use of satellites for direct broadcast into the closed societies that both VOA and RFE/RL strive to reach is evaluated. The creation of Radio Marti, an international broadcaster designed to beam its programming to Cuba, is discussed. S.L.

N82-33596*# Missouri Univ., Columbia.
ACTIVE MICROWAVE REMOTE SENSING RESEARCH PROGRAM PLAN. RECOMMENDATIONS OF THE EARTH RESOURCES SYNTHETIC APERTURE RADAR TASK FORCE
Jun. 1980 116 p refs
(Contract NAS9-15896)
(NASA-CR-167726; NAS 1.26:167726) Avail: NTIS HC A06/MF A01 CSCL 17I

A research program plan developed by the Office of Space and Terrestrial Applications to provide guidelines for a concentrated effort to improve the understanding of the measurement capabilities of active microwave imaging sensors, and to define the role of such sensors in future Earth observations programs is outlined. The focus of the planned activities is on renewable and nonrenewable resources. Five general application areas are addressed: (1) vegetation canopies, (2) surface water, (3) surface morphology, (4) rocks and soils, and (5) man-made structures. Research tasks are described which, when accomplished, will clearly establish the measurement capabilities in each area, and provide the theoretical and empirical results needed to specify and justify satellite systems using imaging radar sensors for global observations. J.M.S.

N82-33597# Naval Postgraduate School, Monterey, Calif.
COMMUNICATIONS PROCESSOR FOR C3 ANALYSIS AND WARGAMING M.S. Thesis
Lloyd Neil Clark, Larry Douglas Pless, and Robert Lee Rapp Mar. 1982 183 p refs
(AD-A115751) Avail: NTIS HC A09/MF A01 CSCL 17/2

This thesis developed the software capability to allow the investigation of C3 problems, procedures and methodologies. The resultant communications model, that while independent of a specific wargame, is currently implemented in conjunction with the McClintic Theater Model. It provides a computerized message handling system (C3 Model) which allows simulation of communication links (circuits) with user-definable delays; garble and loss rates; and multiple circuit types, addresses, and levels of command. It is designed to be used for test and evaluation of command and control problems in the areas of organizational relationships, communication networks and procedures, and combat doctrine or tactics. GRA

N82-33598# Naval Research Lab., Washington, D. C. Computer Science and Systems Branch.
AN APPROACH TO DESCRIBING THE FUNCTIONAL REQUIREMENTS OF AN EMBEDDED COMMUNICATION SYSTEM Final Report
Constance L. Heitmeyer and John D. McLean 14 Jun. 1982 19 p refs
(AD-A115738; NRL-8604) Avail: NTIS HC A02/MF A01 CSCL 17/2

An 'abstract' requirements specification describes a system's externally visible behavior without making decisions about its design. Although they have important advantages, such specifications are difficult to produce for complex systems and hence are seldom seen in the real programming world. This report describes an abstract requirements specification for a complex, real-world system; the specification is intended to serve as a fully worked out example for those tasked to document the requirements of similar systems. After introducing the Navy application with which we are concerned, we demonstrate that the traditional approach of functional decomposition, where each output is expressed as a mathematical function of inputs, leads to premature design decisions. Next, we present a new approach to writing requirements documents that avoids design decisions and thus leads to an abstract specification. The new approach is compared to a similar approach used in a related project. An appendix provides an example that illustrates the formal techniques employed in the approach. Author (GRA)

N82-33599# Naval Research Lab., Washington, D. C. Communication Systems Engineering Branch.
A CONVERSATIONAL TEST FOR COMPARING VOICE SYSTEMS USING WORKING TWO-WAY COMMUNICATION LINKS Interim Report
A. Schmidt-Nielsen and S. S. Everett 11 Jun. 1982 27 p refs (RR0210542)
(AD-A116054; NRL-8583) Avail: NTIS HC A03/MF A01 CSCL 17/2

A conversational test using live two-way communications provides a measure of the actual usability of voice systems, especially when voice quality is degraded. A conversational test developed at NRL was compared with two other communicability tests in a series of experiments using a variety of digital voice processors with data rates from 800 to 32,000 bps. All three tests ranked the voice processors very similarly, but they did not discriminate equally well among different processors. Other advantages and disadvantages of conversational test methods are discussed. Author (GRA)

N82-33600# Stanford Univ., Calif. Dept. of Electrical Engineering.
ON THE ADAPTIVE IMPLEMENTATION OF PISARENKO'S HARMONIC RETRIEVAL METHOD
V. U. Reddy, B. Egardt (ASEA, Sweden), and T. Kailath Dec. 1981 8 p refs Presented at the Intern. Symp. on Microwave and Commun., Kharagpur, India, Dec. 1981
(Contracts F49620-79-C-0058; DAAG29-79-C-0215; DAAG29-79-C-0047; Grant NSF ENG-78-10003; AF Proj. 2304)
(AD-A116003; AFOSR-82-0476TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Two new algorithms for Pisarenko's Harmonic Retrieval Method are introduced. These new algorithms --- Gradient Type (LMS) and Approximate Deterministic Least-Squares Algorithm -- provide faster initial convergence and are able to carry out on line spectrum estimation. Some simulation results are presented. GRA

N82-33601# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NUMERICAL RESULTS OF THE THEORY OF DIFFRACTION OF RADIO WAVES AROUND THE SURFACE OF THE EARTH (SELECTED SECTIONS)
P. A. Azrilyant and M. G. Belkina 20 May 1982 54 p refs Transl. into ENGLISH from the mono. "Chislennyye Rezultaty Teorii Diffraktsii Radiovoln Vokrug Zemnoy Poverkhnosti" Moscow, 1957 p 1-24, 43-44
(AD-A115668; FTD-ID(RS)T-0455-82) Avail: NTIS HC A04/MF A01 CSCL 17/2

Tables and graphs, show the results of the calculation of the attenuation factor of the electromagnetic field of radio waves with horizontal and vertical polarizations in the case of their normal propagation around the Earth. The main calculations of the

attenuation factor are made in sequence and encompass the areas of the shadow and semishadow. The joining of the diffraction curves with curves based on reflection formulas is investigated. Additional formulas, tables and graphs are given which make it possible with the help of simple operations to make a complete calculation of the normal propagation of radio waves (beginning from the illuminated area and ending with the area of deep shadow). An example is given of the application of the numerical results of the work to the calculation of electric field intensity curves for certain wavelengths. GRA

N82-33602# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INTEGRATED SYSTEMS OF AUTOMATIC RADIO EQUIPMENT
M. P. Bobnev, B. Kh. Krivitskiy, and M. S. Yarlykov 20 May 1982 416 p refs Transl. into ENGLISH of the mono. "Kompleksnyye Sistemy Radioavtomatiki" Moscow, Sovetskoye Radio Publishing House, 1968 232 p
(AD-A115670; FTD-ID(RS)T-0139-81) Avail: NTIS HC A18/MF A01 CSCL 17/7

Integrated radio engineering servo systems having non-radiotechnical meters are examined. The characteristics of the most commonly used meters are described, and the integration of separate meters into the system discussed. The uses of gain in accuracy and freedom from interference are considered and some quantitative estimates of gain are presented. Integrated navigation aids and the measurement of angular coordinates, range, and speed are discussed. Results of experimental investigations making possible the evaluation of integrated systems in comparison with nonintegrated systems are presented. J.D.

N82-33603# GTE Sylvania, Inc., Needham Heights, Mass.
HF WIDEBAND MODEM Final Technical Report, 30 Mar. 1979 - 30 Nov. 1981
Victor Ellins, Peter H. Anderson, and Mark N. Sandler Griffiss AFB, N.Y. RADC Apr. 1982 196 p refs
(Contract F30602-79-C-0099; AF Proj. 4519)
(AD-A116859; RADC-TR-82-85) Avail: NTIS HC A09/MF A01 CSCL 17/2

This was an engineering effort to design, simulate, implement and test two HF modems capable of sustaining data rates of 4800 b/s or greater over standard 3 KHz HF channels. The first twelve months of effort encompassed propagation analysis, modulation waveform parameter selection overall modem and decision feedback equalizer (DFE) design, error control study, computer simulation, and real-time hardware and software design tasks. Subsequent work included the real-time modem implementation, preliminary (factory) acceptance testing and final (RADC DICEF) acceptance testing tasks. Also an initial live link test was included. The two identical high data rate HF modem (HFWBM) terminals offer reliable data communication at rates above 1 b/s/Hz over practical HF radio circuits. The characteristics and performance of the HFWBM have been shown to meet or exceed all contrast specifications. Under the contract operation at 2400 b/s and 4800 b/s were requirements, while operation at 9600 b/s in a 3 kHz channel was stated as a design goal. The HFWBM has been demonstrated to be capable of sustaining rates of 2400 b/s, 4800 b/s, 7200 b/s and 9600 b/s in 3 kHz channels. An innovation developed in this effort, a square-root Kalman equalizer adaptation algorithm, has been shown to have the tracking agility and stability characteristics required to successfully follow the time-varying HF channel. GRA

N82-33604# Rome Air Development Center, Griffiss AFB, N.Y. Electromagnetic Sciences Div.
AN ITERATIVE PHASE-ONLY NULLING METHOD
Robert A. Shore Feb. 1982 24 p refs
(AF Proj. 2305)
(AD-A116949; RADC-TR-82-49) Avail: NTIS HC A02/MF A01 CSCL 09/5

An iterative numerical method is presented for calculating the minimum phase-only perturbations of the element weights of a linear array to impose pattern nulls at prescribed locations. The method is based on repeated linearizations of the equations for the imposed nulls. Author (GRA)

N82-33605# Texas Univ., Austin. Applied Research Labs.
METHODS FOR 2-BEAM ARRAY PROCESSING
Terry L. Henderson 17 May 1982 85 p refs
(Contract N00024-79-C-6358)
(AD-A116880; ARL-TM-82-10) Avail: NTIS HC A05/MF A01 CSCL 17/3

Several methods are considered for using paired beamformers to determine, with high precision or resolution, source geometry and bearing angle. Emphasized are broadband methods and ways of processing the beamformer outputs to effect a proportionality relationship that carries the angular information. Author (GRA)

N82-33606# Naval Postgraduate School, Monterey, Calif. Dept. of Electrical Engineering.
MEASURED PERFORMANCE OF A DELAY LOCK TRACKING LOOP WHEN NOISE POWER EXCEEDS SIGNAL POWER M.S. Thesis
Joseph Michael Hanratty 24 Sep. 1982 83 p refs
(AD-A116797) Avail: NTIS HC A05/MF A01 CSCL 17/2

In the communications area there is a general interest in recovering signals below the noise level. In the military this interest translates to low-probability-intercept (LPI) and anti-jam (AJ) communications systems. The receiver improves the signal-to-noise ratio so data can be reliably recovered. This improvement is usually accomplished by matched filtering or by correlation. In this report correlation is used as a post-detection processing technique to derive a synchronous reference. The system considered in this experiment can operate noncoherently by means of a delay lock tracking loop at signal-to-noise ratios as small as -5.0 to -7.1 dB. Furthermore, synchronization is achieved while the received signal is being modulated by data. No preamble or other type of synchronization is required. GRA

N82-33607# Naval Research Lab., Washington, D. C. Radar Div.
TRACKING CLOSELY SPACED MULTIPLE SOURCES VIA SPECTRAL-ESTIMATION TECHNIQUES Interim Report
William F. Gabriel 23 Jun. 1982 21 p refs
(RR0210543)
(AD-A116967; NRL-8603) Avail: NTIS HC A02/MF A01 CSCL 17/9

Modern spectral-estimation techniques have achieved a level of performance that attracts interest in applications area such as the tracking of multiple spatial sources. In addition to the original 'superresolution' capability, these techniques offer an apparent 'absence of sidelobes' characteristic and some reasonable solutions to the difficult radar coherent-source problem that involves a phase-dependent SNR (signal-to-noise ratio) penalty. This report reviews the situation briefly, and it discusses a few of the techniques that have been found useful, including natural or synthetic Doppler shifts, non-Toeplitz forward-backward subaperture-shift processing, and recent eigenvalue/eigenvector analysis algorithms. The techniques are applied to multiple-source situations that include mixtures of coherent and noncoherent sources of unequal strengths, with either an 8-or a 12-element linear-array sampling aperture. The first test case involves the estimation of six sources, two of which are 95% correlated. The second test case involves a tracking-simulation display example of four moving sources: three are -10dB coherent sources 95% correlated, and the other is a strong 20-dB noncoherent source. These test cases demonstrate the remarkable improvements obtained with the recent estimation techniques, and they point to the possibilities for real-world applications. Author (GRA)

N82-33608# Army Electronics Research and Development Command, Fort Monmouth, N. J.
A NOVEL BEAM BUNCHING CONCEPT FOR MILLIMETER WAVE TUBES
Paul Fischer, Calvin Bates, and Joseph Hartley 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117107) Avail: NTIS HC A02/MF A01 CSCL 20/14

A unique electron beam bunching concept has been presented, analyzed, and applied to the development of a novel tube approach. The analysis provides a design base for a new class of millimeter wave tubes. These tubes will be compact, lightweight, reliable, and low cost due to the simplicity of design and construction in comparison to conventional thermionic tubes with magnets. Furthermore, the analysis shows that useful RF gain and efficiency can be achieved at moderate accelerator voltages, which makes possible the use of simplified, low cost, lightweight, power supplies and modulators. Theoretical considerations have been confirmed by evaluation of an experimental multipactor collector model. Furthermore, the results have demonstrated that the electron bunching can be generated and controlled by low RF drive (less than 1 watt), and that the currents generated are useful for new tube approaches. Although experiments were conducted at 5 GHz, the results are applicable for devices operating at millimeter wave frequencies. A 5 GHz prototype tube design has been formulated, and component parts for the tube have been machined and cold-tested. The tube is presently being assembled for subsequent processing and evaluation. It is expected that this simplified, two-cavity design will demonstrate useful gain and efficiency, and provide the technology base for developing new tube prototypes for Army millimeter wave system applications. GRA

N82-33609# Army Electronics Technology and Devices Lab., Fort Monmouth, N. J.

DIELECTRIC WAVEGUIDE ANTENNA

John Borowick, William Bayha, Richard A. Stern, and Richard W. Babbitt 18 Jun. 1982 11 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117305) Avail: NTIS HC A02/MF A01 CSCL 20/3

Investigations have continued into developing design criteria for a dielectric waveguide line source antenna. The Marcatili analysis has proven to be a reliable guide for the transmission line design. There is, however, no practical design information available permitting the synthesis of a symmetrical amplitude taper along a grooved dielectric waveguide antenna. This investigation presents a measurement procedure that will permit a correlation between the radiating element physical configuration and the radiation properties. Additional data for various slot geometries will continue to be accumulated. A theoretical and emperical relationship will then be made so as to further relate the slot geometry to radiation characteristics. Our investigations have demonstrated that a non-metallic grooved dielectric waveguide can be made to radiate with a well-formed antenna pattern resulting from an exponential amplitude taper. This effort will be extended to permit the design of a lower sidelobe dielectric waveguide slot antenna. GRA

N82-33610# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.

AN EMPIRICAL MODEL FOR NEAR MILLIMETER WAVE SNOW EXTINCTION AND BACKSCATTER

Douglas R. Brown 18 Jun. 1982 11 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117350) Avail: NTIS HC A02/MF A01 CSCL 20/14

A snow extinction and backscatter model for near millimeter waves was developed to complete a set of natural atmosphere propagation models for inclusion in the Electro-Optics System Effects Library (EOSAEL). This model is compact, simple, fast, and uses commonly available meteorological data as inputs. The accuracy is commensurate with the accuracy of those input parameters; where the input parameters do not properly characterize the environment, further input specification is available. For snow, the rain equivalent accumulation rate is the fundamental input, with air temperature providing the distinction between dry and wet snowtypes. For millimeter wave (MMW), the classification of the snowflake by its ice-to-liquid-water ratio is necessary, due to the large differences in the complex indices of refraction of ice and water. The snow extinction is presented first, including a review of the data used to generate it. The backscatter model is then discussed, followed by a comparison between the model and measurements made at the Cold Regions Research and Engineering Laboratory (CRREL) SNOW-ONE test in January-February 1982. GRA

N82-33611# Army Missile Command, Redstone Arsenal, Ala.

ACTIVE IMAGING OF RANGE TARGETS AT 1.2 MILLIMETERS

John Lamar Johnson, Kenneth A. Herren, Robert L. Morgan, and George A. Tanton 18 Jun. 1982 9 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117161) Avail: NTIS HC A02/MF A01 CSCL 17/9

Several years ago investigators showed that for detection and tracking of 'obscured' targets at ranges up to 3 km, submillimeter wavelengths in the atmospheric windows between 0.74 - 1.3 mm offer great potential advantages over wavelengths in both the optical and in the microwave regions. At submillimeter wavelengths a significant reduction over the conventional microwave antenna size needed for a given resolution can be realized. Submillimeter waves also penetrate fogs and aerosols much more effectively than do the shorter optical and IR wavelengths. We have demonstrated active target imaging through the atmosphere with a submillimeter wave laser operated at a wavelength of 1.2 mm. Copper corner cube targets were imaged over a maximum atmospheric path of 650 meters (two-way) using an 0.3 meter antenna. The system used in that demonstration has a CO2 pumped SMMW gas laser which is passed through a beam expander to a 0.3 meter diameter f/5 primary mirror and then to a computer controlled two-axis scan mirror which directs the beam down a target range adjacent to the laboratory building. The return beam is collected through the same optics and sent by a beamsplitter to the detector, and the signal is sent to the computer from a lock-in amplifier. The targets consisted of a trio of copper corner cubes at 100 meters from the primary, and a single copper corner cube at 325 meters. GRA

N82-33612# Illinois Univ., Urbana. Dept. of Electrical Engineering.

A FORTRAN PROGRAM FOR RECTANGULAR MICROSTRIP ANTENNAS Interim Report

W. F. Richards and Y. T. Lo Griffiss AFB, N.Y. RADC Apr. 1982 87 p refs

(Grant AF-AFOSR-0234-81; AF Proj. 2305)

(AD-A116952; UILU-ENG-80-2538; EM-80-1; RADC-TR-82-78) Avail: NTIS HC A05/MF A01 CSCL 09/5

This report supplies a program, with examples, for the analysis of rectangular microstrip antennas. The formulas upon which the program is based are also provided. The theory from which these formulas were obtained is based on the 'cavity model' of the microstrip antenna developed at the University of Illinois by Lo, Richards, et al. Details of the theory can be found in the references listed in the bibliography at the end of the report. The first chapter contains the formulas and the definitions of the electrical and geometrical parameters used in the program. Chapter two lists the FORTRAN program which implements these formulas. Chapter three contains examples of the program's use. It includes an example which illustrates the use of the two-port analysis feature of the program to determine the 'tuning range' that a variable capacitor loading one port would have to have in order for the radiator to produce any polarization from left hand circular to right hand circular. Author (GRA)

N82-33613# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

TECHNIQUES FOR DOPPLER SPECTRAL ESTIMATION OF HF RADAR SIGNALS BACKSCATTERED FROM HIGH LATITUDE IONOSPHERE IRREGULARITIES Final Technical Report, 1 Oct. 1980 - 30 Sep. 1981

Raymond A. Greenwald Griffiss AFB, N.Y. RADC Jun. 1982 43 p refs

(Contract N00024-78-C-5384; AF Proj. 2305)

(AD-A116838; RADC-TR-82-67) Avail: NTIS HC A03/MF A01 CSCL 04/1

This report examines various techniques for studying the Doppler spectrum of radar signals backscattered from high latitude

ionospheric irregularities, Both pulsed and FM-CW techniques are considered and it is found that most approaches suffer from the need to have sufficiently high pulse or sweep repetition frequencies while at the same time avoiding range aliasing of the backscattered signals. GRA

N82-33614# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
EFFECT OF GROUND TERRAIN ON MILLIMETER WAVE PROPAGATION Final Technical Report, 1 Jan. 1980 - 31 Aug. 1981
Jin A. Kong and Robert T. Shin Hanscom AFB, Mass. RADC Apr. 1982 28 p refs
(Contract F19628-80-C-0052; AF Proj. 2305)
(AD-A116837; RADC-TR-82-94) Avail: NTIS HC A03/MF A01 CSCL 20/14

In the active and passive microwave remote sensing of Earth terrain using radars and radiometers, the scattering effects due to medium inhomogeneities and surface roughness play a dominant role in the determination of radar back-scattering cross-sections and the brightness temperatures. Two theoretical models were developed to characterize terrain media: (1) a random medium model where scattering effects can be accounted for by introducing a randomly fluctuating part in the permittivities; and (2) the discrete scatterer model where discrete scatterers are imbedded in a homogeneous background medium. The Earth terrain is then modelled as layers of such scattering media bounded by rough surface with air above and homogeneous half space below. In matching the theoretical results with experimental data collected from vegetation and snow fields, the following findings are summarized: (1) for radar observations near nadir, rough surface effects are important; and (2) for snow fields the horizontal correlation length is greater than the vertical correlation length whereas for vegetation fields their relative sizes depend on the types of vegetation. GRA

N82-33615# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MSTRIP2: PARAMETERS OF MICROSTRIP TRANSMISSION LINES AND OF COUPLED PAIRS OF LINES. 1978 VERSION AND ITS APPLICATION
Jerald A. Weiss, Richard S. Withers, and Rodney C. Lewis 4 Jun. 1982 23 p refs
(Contract F19628-80-C-0002)
(AD-A117364; TR-600; ESD-TR-82-035) Avail: NTIS HC A02/MF A01 CSCL 17/2

MSTRIP has undergone a succession of improvements since its original publication in 1968. Performance of the 1974 and later versions relating to aspects including weakly coupled (< -30 dB) pairs, low shield heights (closer than substrate thickness), and extremely low-impedance lines will be discussed. A FORTRAN list of the 1978 version is appended. Author (GRA)

N82-33616# John Carroll Univ., Cleveland, Ohio. Dept. of Physics.
STUDIES OF THE PROPAGATION OF ELASTIC WAVES IN FLUIDS AND SOLIDS Summary Report, 1 Dec. 1974 - 30 Apr. 1982
E. F. Carome 1 May 1982 16 p
(Contract N00014-75-C-0247; NR Proj. 384-309)
(AD-A117370) Avail: NTIS HC A02/MF A01 CSCL 20/14

During the seven and a half year period 1 December 1974 to 30 April 1982 the Acoustics Branch of the Office of Naval Research partially supported an extensive physical acoustics research program in the Department of Physics of John Carroll University. The long range goals of this program, some of its accomplishments, and various research projects that have been conducted with ONR support are outlined in this report. Also included are a list of publications resulting from the contract research and a list of graduate students who have participated in the program, together with titles of their theses. GRA

N82-33617# Florida Univ., Gainesville. Engineering and Industrial Experiment Station.
RESPONSES OF FM/CW SYSTEMS HAVING FILTERS
Peyton Z. Peebles, Jr. Feb. 1982 16 p refs
(Contract DAAK21-81-C-0116; DA Proj. 1L6-62616-AH-77)
(AD-A117371; HDL-CR-82-116-1) Avail: NTIS HC A02/MF A01 CSCL 17/2

The response of a typical FM/CW system's receiver is usually developed by assuming filters at the output of certain mixers are broadband relative to the signals they process. By assuming these filters have arbitrary transfer functions, a new analysis leads to a more general response that is applicable to a broad range of FM/CW system architectures. The response is developed in a form suitable for computer computation. Author (GRA)

N82-33618# Columbia Univ., New York. Radiation Lab.
RESEARCH INVESTIGATION DIRECTED TOWARD EXTENDING THE USEFUL RANGE OF THE ELECTROMAGNETIC SPECTRUM Progress Report, 1 Apr. 1981 - 31 Mar. 1982
George W. Flynn 31 Mar. 1982 182 p refs
(Contracts JPL-955335; JPL-955336; DAAG29-79-C-0079; DAAG29-82-K-0089; N00014-78-C-0517; F49620-82-K-0008; DE-AS02-78ER-04940; Grants NSF ENG-7819426; NSF ENG-78-26498; NSF ECS-80-06881; et al)
(AD-A117626; PR-32) Avail: NTIS HC A09/MF A01 CSCL 20/3

Quantum detection and sensing of radiation are discussed. Physical and photochemical properties of electronic materials are reviewed. Energy transfer and relaxation in small polyatomic molecules are considered. Picosecond energy transfer and photofragmentation spectroscopy are discussed. Generation and control of radiation are also discussed. Author

N82-33619# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
MEMORY AND COMPUTATIONAL REQUIREMENTS FOR TRACKING IN THE ADVANCED COMPUTER SYSTEM Final Report, Feb. 1981 - Feb. 1982
Robert E. Lefferts Jun. 1982 25 p refs
(AD-A117666; DOT/FAA/CT-82/46; DOT/FAA/RD-81/75) Avail: NTIS HC A02/MF A01 CSCL 17/9

Computational and memory requirements of various tracking algorithms were examined for possible application with the 9020 replacement computer. For a wide range of algorithms, including those most likely to be of interest, there are no technological factors which would significantly impact the choice of algorithms given the present state of computer technology. Further, within the next few years, technological advances will totally eliminate memory and computational tracking requirements from significantly impacting system design. It is concluded that the only substantive limitation currently imposed on the selection of tracking algorithms is the ability of the system designer to analyze, specify, test and evaluate the most promising algorithm. Author (GRA)

N82-33620# Harry Diamond Labs., Adelphi, Md.
DESIGN OF MICROSTRIP LINEAR ARRAY ANTENNAS BY COMPUTER
Morris Campi 18 Jun. 1982 14 p refs Presented at the Proc. of the Army Sci. Conf., Adelphi, Md., 15-18 Jun. 1982
(AD-A117399) Avail: NTIS HC A02/MF A01 CSCL 09/5

Today, computer aided design codes can be developed to help antenna engineers in their design of linear or planar array microstrip antennas. This report describes one such code that was developed by using both empirical data and a theoretical model. One major feature of this code is that it allows the designer to vary any one or more of the antenna design parameters and to observe the results, such as changes in the radiation pattern or amplitude distribution displayed at the computer terminal screen. This application provides the tool required by the engineer to determine in a matter of seconds the prime factors affecting his design and to make parametric adjustments or sensitivity studies to help understand and develop his final product. Once a design is established, the engineer is presented with a set of coordinate numbers that can be placed on magnetic or paper tape, which can then be used to fabricate the antenna on printed circuit board

without the need for drawings or art-layout work and thus simplify the engineering process and reduce the time spent. GRA

N82-33621# Army Communications-Electronics Command, Fort Monmouth, N.J.
RESPONSES OF FM/CW SYSTEMS HAVING FILTERS
Donn V. Campbell 18 Jun. 1982 10 p refs Presented at 1982 Army Sci. Conf., 15-18 Jun. 1982
(AD-A117400) Avail: NTIS HC A02/MF A01 CSCL 09/5

In this paper, it has been clearly shown that induced parasitic RF currents can seriously degrade the performance of a radiating system; yet the significance of these undesired spurious currents has been largely ignored by antenna designers, and field users alike. It has been shown that parasitic currents can be effectively suppressed in both narrowband and wideband antenna systems by means of quarter-wavelength stubs (resonance method) and broadband cable chokes. Although effective current suppression techniques exist, further study is necessary to establish engineering design criteria and to extend state-of-the-art current suppression techniques to multi-octave antenna systems. GRA

N82-33622# Naval Research Lab., Washington, D. C. Target Characterization Branch.
PROPERTIES OF EVEN LENGTH BARKER CODES AND SPECIFIC POLYPHASE CODES WITH BARKER TYPE AUTOCORRELATION FUNCTIONS Interim Report
Shimshon Gabbay 12 Jul. 1982 40 p refs
(SF12131691)
(AD-A117415) Avail: NTIS HC A03/MF A01 CSCL 12/1

Properties of even-length Barker codes, if they exist, are derived. The analysis leads to the analysis of polyphase codes. Similar properties are derived for specific types of polyphase codes, with Barker type autocorrelation functions. The analysis is done in the time and frequency domains (including linear algebra and Z transform treatments), and suggests a procedure to search for codes with Barker type autocorrelation functions. The search problem is reduced by using the properties of such codes. GRA

N82-33623# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
HIGH POWER TRANSPORTABLE VLF TRANSMITTER FACILITY
Mitchell H. Dazey and Harry C. Koons 25 May 1982 63 p refs
(Contract F04701-81-C-0082)
(AD-A117419; TR-0082(2940-06)-2; SD-TR-82-31) Avail: NTIS HC A04/MF A01 CSCL 17/2

A 100-kW, transportable, very-low-frequency (TVLF) transmitter facility has been used for magnetospheric wave-injection experiments from sites in Alaska, New Zealand and Norway. A unique feature of the TVLF facility is the antenna which is a conducting cable lofted to an altitude of 1000 m by a 1000 cu m3 helium balloon. The antenna is driven at its base as a monopole above a ground plane. The antenna cable also serves as the balloon tether. The lowest operating frequency in this configuration is 6.6 kHz at which the radiated power is 100 W. At the highest operating frequency used in the experiments, 21 kHz, the radiated power is 10 kW. In Norway power lines were used as antennas. The minimum operating frequency was then 1 kHz and the radiated power is estimated to be about 0.5 W. In this report we describe the components and performance of the TVLF as used for these magnetospheric experiments. Author (GRA)

N82-33624# Illinois Univ., Urbana. Electromagnetics Lab.
AN ANALYTICAL INVESTIGATION OF FIN LINES WITH MAGNETIZED FERRITE SUBSTRATE
Y. Hayashi and R. Mittra Jun. 1982 22 p refs
(Contract DAAG29-82-K-0084)
(AD-A117504; UIEM-82-4; UILU-ENG-82-2542; ARO-18054.1-EL) Avail: NTIS HC A02/MF A01 CSCL 09/1

This paper presents an analysis method of the fin line on a magnetized ferrite substrate. The method is based on the application of the network analysis techniques of electromagnetic fields (8), (9) in conjunction with the Galerkin's procedure. The determinantal equation for the propagation constant of a unilateral fin line is obtained via matrix formulation. Convergence checks are performed by increasing the number of basis functions for the representation of the aperture field. Some representative numerical results are included in the paper. The method of analysis is quite general and is applicable to other types of fin line structures containing anisotropic media. GRA

N82-33625# Maryland Univ., College Park. Dept. of Electrical Engineering.
EXPERIMENTAL AND THEORETICAL INVESTIGATION OF MICROWAVE AND MILLIMETER WAVE RADIATION FROM HOLLOW, ROTATING, ELECTRON BEAMS Annual Report, 1 Dec. 1979 - 30 Nov. 1981
William W. Destler, R. L. Weiler, and Charles D. Striffler Nov. 1981 34 p refs
(Contract AF-AFOSR-3690-78; AF Proj. 2301)
(AD-A117896; AFOSR-82-0532TR) Avail: NTIS HC A03/MF A01 CSCL 20/7

During this period this effort has explored the scaling of the negative mass instability to regimes associated with smaller plasmas and short wavelengths for the plasma-produced radiation. An experimental apparatus for these studies is near completion. The nonlinear electromagnetic interaction between the collective/ bunches of electrons and the radiation field has been formulated in an attempt to derive the efficiency of the production of radiation. In addition, the Dragon electron beam source is currently being improvêd for future radiation production experiments based on the negative mass instability. Experimental efforts at high powers have resulted in the enhancement of radiation at a single frequency. This last effort has utilized a 'double-magnetron cavity' to enhance the radiation power in Ka band at 26 and 41GHz. Author (GRA)

N82-33626# Naval Ocean Systems Center, San Diego, Calif. RF and Acoustic Communications Technology Branch.
DECISION-FEEDBACK EQUALIZER SIMULATION (DFES): DESCRIPTION OF VARIABLES Technical Progress Report, Oct. 1980 - Mar. 1981
K. L. Payne Jan. 1982 119 p refs
(AD-A117898; NOSC/TD-469) Avail: NTIS HC A06/MF A01 CSCL 09/2

This document lists and describes the usage of the variables in the Decision-Feedback Equalizer Simulation (DFES) program which was written for the Naval Ocean Systems Center by Signatron, Inc. The DFES program can transmit QPSK or BPSK through an hf channel. The channel can have fading, Doppler and multipath. The transmission can be received and demodulated by a Desicion-Feedback Equalizer with one of four weight update algorithms: Kalman, LMS, fixed, and Rake. Author (GRA)

N82-33627# M/A-COM LINKABIT, Inc., San Diego, Calif.
EARTH STATION INTERFACE FOR DEMAND ASSIGNMENT APPLICATIONS Quarterly Technical Report, 1 Apr. - 30 Jun. 1982
30 Jun. 1982 12 p
(Contract MDA903-81-C-0638; ARPA Order 3674)
(AD-A117721) Avail: NTIS HC A02/MF A01 CSCL 22/2

The High Speed Burst Modem (LBM36A) processes data from the Interface Control and Codec Unit (LCC36A) and the Western Union Earth Station. The high bandwidth signal processing tasks, such as modulation, demodulation, preamble detection, etc., are primarily performed by special purpose hardware. The microprocessor is primarily designed to perform controlling and monitoring functions. The LBM36A is a functional enhancement of the LBM36 burst modem. Due to the nature of the enhancements, additional software must be created and integrated into the general structure. This can be done most clearly by modifying the LBM36 software structure from its present dual path format to a simpler one path structure. The LBM36A must perform all the previously mentioned functions in a manner identical to the LBM36. In addition, it must perform uplink tuning, downline loading, enhanced built-in-test, and other functions. This quarterly technical report will compare the LBM36 and the LBM36A software structures. GRA

N82-33628# La Jolla Inst., Calif. Center for Studies of Nonlinear Dynamics.
PATH INTEGRAL FORMATION OF WAVE PROPAGATION IN THE IONOSPHERE, 4 Final Report
V. Seshadri and Bruce J. West 1982 63 p refs
(Grant AF-AFOSR-0187-80; AF Proj. 2310)
(AD-A117723; LJI-R-82-195; AFOSR-82-0578TR) Avail: NTIS HC A04/MF A01 CSCL 20/14

The validity of the application of weak scatter theory to ionospheric scattering data has been examined. It is concluded that the weak scatter theory is not universally applicable. Born and Rytov weak scatter calculations are compared and the Rytov calculations is found superior. The Rytov calculations appear to explain the enhancement in the scintillation index (the ratio on the intensity variance to variance of phase) in the equatorial vis a vis the polar stations. This research effort will be completed under Contract Number 49620-82-C-0058. Author (GRA)

N82-33629# Army Construction Engineering Research Lab., Champaign, Ill.
ARC-SPRAYED METALS FOR STRUCTURAL ELECTROMAGNETIC SHIELDING Final Report
Paul Nielsen Jun. 1982 22 p refs
(DA Proj. 4A7-62719-AT-50)
(AD-A117673; CERL-TR-M-316) Avail: NTIS HC A02/MF A01 CSCL 13/13

Electromagnetic shielding tests of small samples (2 ft by 4 ft or 0.61 m by 1.22 m) of arc-sprayed metals on typical construction materials were conducted to determine the feasibility of using arc-spray technology to provide a low-cost method of shielded construction. Test results indicate that such panels can provide significant shielding and that this technology may be useful for applications having a low shielding requirement. In an additional study, it was determined that arc-spraying of leaky seams of conventional modular shielded construction can provide increased electromagnetic shielding. Author (GRA)

N82-33630# Sandia Labs., Albuquerque, N. Mex. Experiments Div.
UNDERGROUND SCANNING WITH AN IMPULSE RADAR
C. Wayne Cook Mar. 1982 44 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015495; SAND-82-0470) Avail: NTIS HC A03/MF A01

Impulse radar is being evaluated for possible applications at the Waste Isolation Pilot Project (WIPP) in southeastern New Mexico. Potential applications are scanning salt to identify inclusions, structural discontinuities, and other anomalies before excavation; and verifying the locations of stored radioactive-waste canisters. Four underground experiments were run. The extent and shape of dome-salt pillars and a langbeinite pillar were measured with the radar. Metal targets that simulated waste canisters were located to within a few centimeters after they had been buried for 18 months. If the material being scanned contains clay seams and other conductive inclusions, penetration by radar is limited. It is anticipated that clean bedded salt will be an excellent medium for scanning with an impulse radar. The impulse radar as it now exists can be used for WIPP applications. DOE

N82-33631# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
THE MEAN AND VARIANCE OF SKYWAVE RADAR SEA-ECHO POWER SPECTRA FOR DISCRETE IONOSPHERIC MULTIPATH
R. M. Jones Nov. 1981 31 p refs
(PB82-174236; NOAA-TM-ERL-WPL-85; NOAA-81122902) Avail: NTIS HC A03/MF A01 CSCL 08C

Formulas for the mean and variance of skywave radar sea echo Doppler spectra are transformed from a discrete representation to a general convolution form. While the discrete representation is general enough to represent arbitrary sea echo spectra and arbitrary ionospheric distortion spectra, the derivation of the variance assumes that both spectra are composed of discrete spectra lines that are narrower than the spectral width of the window (or weighting function) applied to the measured time series and that the separation of the spectral lines is large compared with the spectral width of the window. The formulas are shown to be consistent with corresponding formulas derived from a continuous representation under the same physical assumptions. However, the formula for variance based on discrete spectra differs from that derived from a continuous representation under physical conditions that assume more continuous spectra for both the sea echo and the ionospheric distortion. GRA

N82-33632# Urban Sciences, Inc., Pennsauken, N.J.
DIGITAL COMMUNICATIONS TECHNIQUES AND EQUIPMENT FOR LAW ENFORCEMENT USE Final Report
Jan. 1982 78 p refs
(PB82-195496; NBS-GCR-81-356) Avail: NTIS HC A05/MF A01 CSCL 17B

The suitability of various types of digital communications equipment for use by law enforcement agencies was evaluated. Present voice message traffic on typical police radio networks is reviewed and operational requirements for digital communications equipment discussed. The possible applications of digital communications equipment for law enforcement use are considered and the characteristics of mobile digital terminals listed. A brief technical discussion of mobile digital communications is provided. J.D.

N82-33633# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.
OUTPUT TUBE EMISSION CHARACTERISTICS OF OPERATIONAL RADARS
R. J. Matheson, J. D. Smilley, G. D. Falcon, and V. S. Lawrence Jan. 1982 47 p refs
(PB82-193426; NTIA-82-92) Avail: NTIS HC A03/MF A01 CSCL 17I

Measurement of the emission spectra and other characteristics of many radars operating in the government frequency bands is described. The emission spectra of 19 different types of radars, selected to show the different emission spectrum characteristics produced by a variety of radar output tube technologies are presented. The radars include examples of ground based search, airport surveillance, weather, and height finding radars operating in L band, S band, or C band. The RSMS, contained within a mobile van, is described, along with the measurement techniques used for obtaining radar emission characteristics. The emission limits imposed by the Radar Spectrum Engineering Criteria (RSEC) are displayed with each emission spectrum. GRA (Author)

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-33634*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
METHOD FOR SEQUENTIALLY PROCESSING A MULTI-LEVEL INTERCONNECT CIRCUIT IN A VACUUM CHAMBER Patent Application
Donald E. Routh and Gian C. Sharma, inventors (to NASA) (Sharma and Associates) Filed 19 Aug. 1982 16 p
(NASA-Case-MFS-15670-1; US-Patent-Appl-SN-409679) Avail: NTIS HC A02/MF A01 CSCL 09C

The processing of wafer devices to form multilevel interconnects for microelectronic circuits is described. The method is directed to performing the sequential steps of etching the via, removing the photo resist pattern, back sputtering the entire wafer surface and depositing the next layer of interconnect material under

common vacuum conditions without exposure to atmospheric conditions. Apparatus for performing the method includes a vacuum system having a vacuum chamber in which wafers are processed on rotating turntables. The vacuum chamber is provided with an RF sputtering system and a DC magnetron sputtering system. A gas inlet is provided in the chamber for the introduction of various gases to the vacuum chamber and the creation of various gas plasma during the sputtering steps. NASA

N82-33635*# ITT Aerospace/Optical Div., Fort Wayne, Ind.
INTAGLIATED PHOSPHOR SCREEN IMAGE TUBE PROJECT Final Report
Richard J. Hertzel 15 May 1982 89 p refs
(Contract NAS5-26417)
(NASA-CR-170445; NAS 1.26; 170445) Avail: NTIS HC A05/MF A01 CSCL 09C

The production and evaluation of a magnetic focus image tube for astronomical photography that has an intagliated phosphor screen is described. The modulation transfer function of such a tube was measured by electronic means and by film tests, and the results compared with tubes of more conventional construction. The physical properties of the image tube and film combination, the analytical model of the optical interface, and the salient features of the intagliated screen tube are described. The results of electronic MTF tests of the intagliated image tube and of the densitometry of the tube and film test samples are presented. It is concluded that the intagliated screen is a help, but that the thickness of the photographic film is also important. J.D.

N82-33636*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SUMMARY OF ELECTRIC VEHICLE dc MOTOR-CONTROLLER TESTS Final Report
E. F. McBrien and H. B. Tryon Sep. 1982 30 p refs
(Contract DE-AI01-77CS-51044)
(NASA-TM-82863; E-1232; DOE/NASA/51044-28; NAS 1.15:82863) Avail: NTIS HC A03/MF A01 CSCL 13F

The differences in the performance of dc motors are evaluated when operating with chopper type controllers, and when operating on direct current. The interactions between the motor and the controller which cause these differences are investigated. Motor-controlled tests provided some of the data the quantified motor efficiency variations for both ripple free and chopper modes of operation. S.L.

N82-33637# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
WAVEGUIDE Y-CIRCULATOR
A. A. Shimko, V. N. Shakhgedanov, A. K. Stolyarov, and V. I. Volman 3 Mar. 1982 6 p Transl. into ENGLISH of Russian Patent no. 252428 (22 Sep. 1969) p 1-2
(AD-A112086; FTD-ID(RS)T-0167-82) Avail: NTIS HC A02/MF A01 CSCL 09/1

A waveguide Y-circulator containing a magnetized ferrite element located in the center of the H plane branching is described. In order to increase the frequency band and to reduce the standing wave ratio over a broad range of temperatures, one or several metal cylinders are positioned axially in relation to the ferrite element. The cylinder or cylinders together with the ferrite element form a low Q factor resonator of the first harmonic of the electrical field. J.D.

N82-33638# Naval Research Lab., Washington, D. C. Plasma Physics Div.
PINCH-REFLEX-DIODE SCALING ON THE AURORA PULSER Interim Report
R. A. Meger and F. C. Young 29 Jun. 1982 29 p refs
(AD-A116055; NRL-34838) Avail: NTIS HC A03/MF A01 CSCL 09/1

A pinch-reflex ion diode has been operated on the Aurora pulser in positive polarity at impedances ranging from 10 to 35 omega. Ion-generation efficiencies of 20% were observed with ion energies ranging from 2.5 to 5 MeV. The ion current scaled inversely with the anode-cathode gap, and a peak value of 65 kA was measured for the smallest gap. A plasma erosion switch was used to decrease prepulse and gap closure in the diode. Author (GRA)

N82-33639# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SERVO SYSTEMS OF COMBINED CONTROL
B. V. Novoselov, Yu. S. Gorokhov, and A. A. Kobzev 26 May 1982 7 p Transl. into ENGLISH of Russian Patent No. 328427 (2 Feb. 1972) 3 p
(AD-A115994; FTD-ID(RS)T-0644-82) Avail: NTIS HC A02/MF A01 CSCL 09/5

A combined control servo system comprised of a comparison element, the blocks of the primary circuit of the servo system, and a first differentiator connected to the input of the servo system is described. The output of differentiator is connected to a unit with a controllable saturation point which in turn is connected to the input of the blocks of the primary circuit of the servo system and to a second differentiator connected via the second unit with a controllable saturation point to the point of the primary circuit blocks of the servo system. To achieve optimum filtration of the interference in the input signal at a given dynamic accuracy of the system, it is equipped with a selftuning circuit comprised of the series connected high frequency filter and an averager whose output is connected to the second differentiator, while the input of the filter is connected to the output of the comparison element. J.D.

N82-33640# Texas Technological Univ., Lubbock. Plasma and Switching Lab.
WORKSHOP ON DIFFUSE DISCHARGE OPENING SWITCHES Final Report
M. Kristiansen and K. Schoenbach 23 Apr. 1982 264 p refs Workshop held at Tamarron, Colo., 13-15 Jan. 1982 Sponsored by Battelle Columbus Labs.
(Contract DAAG29-81-D-0100)
(AD-A115883) Avail: NTIS HC A12/MF A01 CSCL 09/5

The limitations of diffuse discharge switches with regard to possible applications was discussed. Relevant research problems were identified and research goals were established. Inductive switching principles, fundamental processes in diffuse discharges, optical control of diffuse discharges, and modeling of diffuse discharges were among the topics discussed. R.J.F.

N82-33641# Office of the Under Secretary of Defense for Research and Engineering, Washington, D. C. Defense Science Board.
OPTIMAL PLANNING AND EXECUTION OF DOD VLSI ACTIVITIES Final Report
17 Feb. 1981 60 p
(AD-A117238) Avail: NTIS HC A04/MF A01 CSCL 09/5

The Task Force on VHSIC has throughly reviewed the DoD VHSIC program and has addressed each of the issues contained in its charge as well as an additional issue, that of the role of DoD laboratories with VHSIC capabilities. This review has been aided greatly by presentations from DoD, university, and industry leaders indentified in the Appendix. It has been found that VHSIC is an exemplary DoD technology program responding to critical needs and progressing well. The findings and recommendations presented here and amplified in the text are concerned primarily with the continuation of this success to where VHSIC and beyond-VHSIC technologies are fully developed and become operational in defense systems. GRA

N82-33642# Texas Instruments, Inc., Dallas. Equipment Group.
SUPERCONDUCTIVE NIOBIUM OXIDE TUNNEL DEVICE PROGRAM Final Report, 1 Sep. 1980 - 15 Jan. 1981
Spencer A. Buckner 15 Apr. 1982 30 p refs
(Contract N00014-80-C-0938)
(AD-A117000) Avail: NTIS HC A03/MF A01 CSCL 20/12

The purpose of this program was to develop the technology for the fabrication of small-area Josephson tunnel junctions with

niobium electrodes for use as microwave detectors and mixers. Niobium-niobium oxide-lead junctions were used to establish processes for sputter cleaning and sputter oxidizing the niobium base electrode. When these processes were established, niobium-niobium oxide-niobium junctions were made by sputtering the base electrode, sputtering cleaning and sputter oxidizing the base electrode in a sputter deposition system with backsputter capability, and evaporating the upper electrode in an electron-beam evaporation system. Experiments were also done to make junctions with aluminum-oxide barriers. The report is divided into seven parts: (1) vacuum systems, (2) masks for photolithography, (3) processing techniques, (4) niobium-niobium oxide-lead junctions, (5) niobium-niobium oxide-niobium junctions, (6) niobium-aluminum oxide-aluminum-niobium junctions, (7) summary and conclusions. GRA

N82-33643# Army Armament Research and Development Command, Dover, N. J. Scientific and Engineering Applications Div.
A SPICE2 MODEL FOR THE M732 ANALOG TIMER INTEGRATED CIRCUIT Final Report
John P. Tobak Jun. 1982 47 p refs
(AD-A117012; AD-E400863; ARMID-TR-82001) Avail: NTIS HC A03/MF A01 CSCL 19/1

The development of a SPICE2 circuit model for the M732 analog timer integrated circuit (Motorola SC25362PH-7749) is described. Overall circuit operation, timer model usage and a comparison of model and hardware measured results are also presented. GRA

N82-33644# Army Electronics Technology and Devices Lab., Fort Monmouth, N. J.
THE PLANAR DOPED BARRIER: A NEW CLASS OF ELECTRONIC DEVICES
Roger J. Malik, Thomas R. AuCoin, Raymond L. Ross, and Robert O. Savage 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117307) Avail: NTIS HC A02/MF A01 CSCL 20/12

A new majority carrier rectifying device known as a 'planar doped barrier' (PDB) has been successfully demonstrated in GaAs. The structure has an N+-i-p+-i-n+ configuration in which an extremely narrow p+-planar region is grown in an undoped region by MBE. The barrier height can be readily varied from zero to approximately the bandgap of the semiconductor. Also, parasitic resistance and capacitance in the PDB can be independently minimized, which leads to theoretical cutoff frequencies even higher than those obtained in the best Schottky barrier mixer diodes. In addition, the capacitance of the devices is essentially constant with bias voltage over their whole operating range. The dominant transport mechanism is by majority carrier thermionic emission over the barrier for both positive and negative bias. Although the PDB concept has been experimentally demonstrated in GaAs, it is applicable to all semiconductors in general. Also, since the PDB structure is formed in a single semiconductor, the problems associated with interfaces between dissimilar materials are avoided. A variety of new device structures has already been realized through the unique characteristics of the planar doped barrier. The PDB concept is expected to have significant applications in high frequency and millimeter-wave devices, including mixer, Gunn and Baritt diodes, photodiodes, switches, FET's, and MMW transistors. GRA

N82-33645# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
FAULT DIAGNOSIS OF NONLINEAR ANALOG CIRCUITS. VOLUME 1. DC DIAGNOSIS OF HARD FAILURES
P. M. Lin and Y. S. Elcherif Jul. 1982 62 p refs 2 Vol.
(Contract N00014-81-K-0323)
(AD-A117567; TR-EE-82-21) Avail: NTIS HC A04/MF A01 CSCL 09/5

The dc fault dictionary approach has been found very useful for locating hard failures (open circuits and short circuits) in nonlinear analog circuits. In this research project, we have introduced several new techniques to enhance the capability of the dc fault dictionary. Among our new results, the most significant ones are: (1) The use of the complementary pivot method to find test node voltages under all faults. (2) The set-up of the fault dictionary in the form of integer codes instead of test node voltages. The former technique makes it possible to rapidly analyze large circuits under all fault conditions. Author (GRA)

N82-33646# National Materials Advisory Board, Washington, D.C.
AN ASSESSMENT OF THE IMPACT OF THE DEPARTMENT OF DEFENSE VERY HIGH SPEED INTEGRATED CIRCUIT PROGRAM Final Report
Jan. 1982 153 p
(Contract N00039-80-C-0125)
(AD-A117459; NMAB-382) Avail: NTIS HC A08/MF A01 CSCL 09/5

The technical and economic effects of the Department of Defense's (DoD) development program for very-high-speed integrated circuits (VHSIC) are examined. The probable effects of this program on the domestic aspects and international position of the integrated-circuit (IC) industry as they relate to the interests of the general public and the DoD are considered. The report presents a review of the unique DoD needs that motivate VHSIC research and development; an estimate of the degree of which these needs are likely to be met by the VHSIC program; a discussion of the effects of the program's demands for manpower, materials, and design and processing technologies; the problems connected with the program's technology export controls; and an assessment of the impact of the program on the structure of the U.S. integrated-circuit industry, its continued development and production of civilian consumer products, and its international competitive position. Author (GRA)

N82-33647# CNR, Inc., Needham, Mass.
TIMING SUBSYSTEM DEVELOPMENT Final Technical Report
K. R. Backe Griffiss AFB, N.Y. RADC May 1982 214 p refs
(Contract F30602-78-C-0287; AF Proj. 2157)
(AD-A117609; RADC-TR-82-124) Avail: NTIS HC A10/MF A01 CSCL 09/3

In the predominately digital DCS, a requirement exists to coordinate clocks at geographically distinct nodes to handle switched digital traffic and provide a general system timing capability. Aside from the characteristics of the clocks, medium, and link equipment, the synchronization technique itself is an important aspect in considering overall network performance. This document presents the findings of a program in which three experimental timing subsystem prototypes were designed, fabricated and field tested in a small network of troposcatter and microwave communications links. The purpose of this effort was to implement and evaluate the performance of each of five candidate timing techniques in a network environment. These candidates are: Independent Clocks, Master/Slave, Mutual Synchronization, Time Reference Distribution, and Improved Time Reference Distribution. This report includes discussions of the timing subsystem, measurement plan, and evaluation of the capabilities and performance characteristics of the candidate clock disciplining methods. Recommendations are presented based on the findings of the field tests and an evaluation of the design of both hardware and software portions of the timing subsystem prototype. Author (GRA)

N82-33648# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
IMPROVING ELECTRIC GROUNDING IN FROZEN MATERIALS
A. J. Delaney, P. V. Sellmann, and S. A. Arcone Jun. 1982 16 p refs
(DA Proj. 4A7-62730-AT-42)
(AD-A117873; CRREL-SR-82-13) Avail: NTIS HC A02/MF A01 CSCL 20/3

This study shows that resistance to ground of a simple vertical electrode in frozen fine-grained soil can be lowered significantly by placing it in a hole backfilled with a conductive soil-salt mixture. These tests were performed near Fairbanks, Alaska, in perennially frozen silt. Three electrodes were installed in holes created by

detonating standard military shaped charges placed at the ground surface. The backfill contained varying amounts of salt. Measurement of resistance to ground of each electrode was made seasonally. The resistance to ground was lowered by an order of magnitude by the addition of a water-saturated salt-soil backfill. Improvement persisted six months after the backfill was placed and allowed to freeze. The degree of improvement provided by this technique will be a function of grain size and permeability of the surrounding soil. Author (GRA)

N82-33649# Martin Marietta Aerospace, Orlando, Fla.
AUTOMATIC TEST METHODS FOR LINEAR MICROCIRCUITS Final Technical Report, Jul. 1980 - Jun. 1981
Steve Broderick and Hans Siepmann Griffiss AFB, N.Y. RADC May 1982 49 p
(Contract F30602-80-C-0184; AF Proj. 2338)
(AD-A117594; OR-16521; RADC-TR-82-115) Avail: NTIS HC A03/MF A01 CSCL 09/5

The objective of this effort was to review MIL-M-38510 operational amplifier and comparator electrical test conditions, and to develop simplified test procedures of these parts on general purpose automatic test equipment. There was an emphasis on gain measurements. However, all parameters were investigated for implementation on ATE as well as the effects of accuracy, repeatability, and chip heating. Modifications to MIL-M-38510 slash sheets are recommended, as well as additions to same. Author (GRA)

N82-33650# Rutgers Univ., New Brunswick, N. J. Lab. for Computer Science Research.
THE CRITTER SYSTEM: ANALYZING DIGITAL CIRCUITS BY PROPAGATING BEHAVIOR AND SPECIFICATIONS Interim Technical Report
Van E. Kelly and Louis I. Steinberg Jul. 1982 19 p
(Contract N00014-81-K-0394; ARPA Order 4147)
(AD-A117887; Rept-4-25664) Avail: NTIS HC A02/MF A01 CSCL 09/2

CRITTER is a system that reasons about digital hardware designs, using a declarative representation that can represent components and signals at arbitrary levels of abstraction. CRITTER can derive the behaviors of a component's outputs given the behaviors of the inputs, it can derive the specifications a component's inputs must meet in order for some given specifications on the outputs to be met, and it can verify that a given signal behavior satisfies a given specification. Author (GRA)

N82-33651# General Electric Co., Binghamton, N.Y. Armament and Electrical Systems Dept.
MOTOR TECHNOLOGY FOR ELECTRIC REMOTELY PILOTED VEHICLE (RPV) Final Report, Sep. - Dec. 1981
M. M. Walters and D. N. Taneja Wright-Patterson AFB, Ohio AFWAL May 1982 64 p
(Contract F33615-81-C-2056; AF Proj. 3145)
(AD-A117732; AES-13609; AFWAL-TR-82-2024) Avail: NTIS HC A04/MF A01 CSCL 01/3

Electric propulsion offers significant advantages over the present gasoline engine propulsion system on a remotely piloted vehicle (RPV). The advantages are the result of technical advances in batteries, power transistors, permanent magnets and control methods. This program is a continuation of an exploratory development effort by the Air Force in electric propulsion for the RPV. This report presents the parametric data from a trade study of nine motor/control designs. The relationship between cost, weight and efficiency of the motor/control system is determined so that the entire RPV propulsion system can be optimized. An additional motor/control design is presented which considers a high voltage source and high speed propeller. Author (GRA)

N82-33652# Utah Univ., Salt Lake City. Dept. of Bioengineering.
EQUILIBRIUM NOISE IN ION SELECTIVE FIELD EFFECT TRANSISTORS Interim Report
Andre M. Haemmerli, Jiri Janata, and James J. Brophy 21 Jul. 1982 36 p refs
(Contract N00014-81-K-0664)
(AD-A117525; TR-1) Avail: NTIS HC A03/MF A01 CSCL 09/1

It has been shown that noise which is in excess of the semiconductor device noise can be identified with the electrochemical processes taking place in ISFETs. The frequency analysis of this noise yields information about interfacial capacitance and exchange current density at the membrane/solution interface. These parameters have been evaluated for several ion-selective membranes. GRA

N82-33653# Materials Research Labs., Ascot Vale (Australia). Physics Div.
A SYSTEM FOR COMPUTER-AIDED DESIGN OF PRINTED CIRCUIT BOARDS
T. Pietsch Apr. 1982 54 p refs
(AD-A117696; MRL-R-851) Avail: NTIS HC A04/MF A01 CSCL 09/2

A general purpose system for interactive computer-aided design of printed circuit boards is described. Included are details for encoding a circuit diagram in the computer, the placement of electronic component packages, the determination of a link/wire list and the routing of this list to obtain a wire layout. Design documentation in the form of component schedules and layout drawings are produced so that artwork can be generated on a Gerber drafting machine. A feature of the system is the method by which the routers find different size wire-paths on successive grids of increasing resolution. The use of this method approximately halves the routing time and increases the link connection rate by over 15%. Author (GRA)

N82-33654# Minnesota Univ., St. Paul.
THE EXAMINATION OF ELECTRICAL-BREAKDOWN PROPERTIES OF INSULATING GASES USED IN ELECTROSTATIC ACCELERATORS Final Report
15 Feb. 1981 11 p
(DE82-009106; DOE/ER-10417/1) Avail: NTIS HC A02/MF A01

The work supported by this contract completed a set of measurements on the breakdown properties of insulating gases. There were four major sections, first the improvement of the statistical accuracy of data on the properties of mixtures of sulphur hexafluoride and Freon 12, second the acquisition of data at higher pressures of pure sulphur hexafluoride, and third the preliminary examination of the properties of nitrous oxide for use as a possible gas insulator. Finally the data obtained were used to calculate the expected electrical breakdown performance of existing FN, MP XTU and the Daresbury (UK) N.S.F. accelerators. DOE

N82-33655# Westinghouse Electric Corp., Pittsburgh, Pa. Research and Development Center.
DEVELOPMENT OF A HIGH CONDUCTIVITY INTERCALATED GRAPHITE COMPOSITE WIRE
S. C. Singhal Feb. 1982 147 p refs
(Contract DE-AC01-79ET-29044)
(DE82-008973; DOE/ET-29044/1) Avail: NTIS HC A07/MF A01

Composite wires previously fabricated by swaging and claimed to possess conductivity equal to or greater than that of copper were analyzed. Intercalation of HOPG crystals with SbF5 + HF mixtures was studied to assess the effect of defects in the starting graphite on the final conductivity and also to determine the conductivity as a function of the stage of the compound. Composite wires consisting of copper, aluminum or lead outer sheath and SbF5 + HF-or AsF5-intercalated graphite in the core were fabricated by swaging and/or drawing and then analyzed for their electrical conductivity. DOE

N82-33656# Sandia Labs., Livermore, Calif. Materials Development Div.
SCREENING TESTS OF CONFORMALLY-COATED PRINTED WIRING BOARDS
M. D. Skibo and W. R. Even Mar. 1982 22 p refs
(Contract DE-AC04-76DP-00789)
(DE82-012873; SAND-82-8215) Avail: NTIS HC A02/MF A01

Identical printed wiring boards (PWB) were fabricated using glass-triazene as substrates and were conformally coated with either conothane or parylene. The boards were then placed in sealed canisters along with TATB and other organic materials found in recent weapon systems. While subjected to electrical potentials of 120V and 250V, these PWBs were either aged at 600, 700, or 800 or temperature cycled for as long as 16 months. The resistivities of the boards were precisely measured before and after aging to determine the effect of time, temperature, and environment on the electrical characteristics of board materials. In all cases board resistivity increased with temperature and duration of test. This increase was believed to be related to either a reduction in water content in the board substrate or a completion of cure of the conformal coating with time elevated temperature. Both mechanisms would result in a reduction in conductive species. In spite of high humidity levels, no evidence of current activated filament formation between adjacent active circuit paths on aged PWBs was seen. DOE

N82-33657# Bendix Corp., Kansas City, Mo.
ELECTRONIC TESTER STUDY Final Report
D. L. Cogan Jun. 1982 11 p refs
(Contract DE-AC04-76DP-00613)
(DE82-016028; BDX-613-2700) Avail: NTIS HC A02/MF A01

A study was initiated to investigate and determine the optimum means of upgrading the capability and capacity of an existing development electronic product test system to meet anticipated workload requirements, and at the same time enable the departmental technical staff to increase productivity. It was determined that a multiple hardware interface capability will be needed to support the anticipated workload. A greater data manipulation capability also is needed to analyze and display information, and an increase in directly addressable program space is needed to eliminate the need for users of the system to understand the complexities of the operating system. DOE

N82-33658# Aerospace Corp., Los Angeles, Calif.
FRAMEWORK FOR POWER-NETWORK ANALYSIS
L. B. Jocic, C. K. Cretcher (DOE, Washington), and T. A. Trygar 1981 23 p refs
(Contract DE-AC01-80RA-50157)
(DE82-012724; DOE/RA-50157/T1) Avail: NTIS HC A02/MF A01

The framework for analysis of electric power networks proposed is motivated by the emerging concepts of power system security. Quantitative measures of system security can be derived within this framework on the basis of regions of operation in the space of system variables and parameters. Probabilistic aspects of load fluctuations and random faults in the network are included in the derivation of the probability number characterizing the level of security of each operating point. Additional research will be required for the practical application of this framework in planning and operating power systems. DOE

N82-33659# Brown Boveri Electric, Inc., Chalfont, Pa.
THE 1200-kV SYSTEM STUDY Final Report
Washington DOE Feb. 1982 492 p refs
(Contract DE-AC01-78ET-29064)
(DE82-014512; DOE/ET-29064/1) Avail: NTIS HC A22/MF A01

Performance requirements for a 1200 kV circuit breaker for use in a gas-insulated substation were defined and a performance analysis of a 1200 kV insulator/disconnect switch for gas-insulated substation performed. The performance requirements included: insulation requirements of 60 Hz, switching surge and lightning, both phase to ground and across the open breaker; prospective transient recovery voltage requirements related to fault current interrupting; an opening scheme capable of limiting phase to ground and across the breaker overvoltages resulting from line dropping and out of phase switching; a closing scheme capable of limiting line overvoltages during reclosing to 1.5 pu (2 percent level). The investigation of each of these items and of lightning characteristics and effects is discussed. The 1200 kV disconnect switch study analyzed bus energizing, bus de-energizing, transformer de-energizing, and the effect of hysteresis losses. Results from these analyses are presented. DOE

N82-33660# Philadelphia Electric Co., Pa. Engineering and Research Dept.
EVALUATION OF UNDERGROUND dc TRANSMISSION SYSTEMS Technical Progress Report, 1 May 1981 - 15 Mar. 1982
16 Mar. 1982 120 p
(Contract DE-AC05-80RA-50158)
(DE82-012312; DOE/RA-50158/T1; TPR-3) Avail: NTIS HC A06/MF A01

Progress in a program for evaluating underground dc transmission systems is reported. A basic load flow model was developed for a large ac power system. This model will be adjusted to produce representations for 4000, 8000, and 12,000 MW energy park. Load flow conditions for dc lines are being calculated. The stability of ac and dc are being examined. Short circuit duties are being calculated. Load flow computer runs are being made to demonstrate the suitability of developed ac and dc options. DOE

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N82-33661# Cambridge Univ. (England). Dept. of Engineering.
FLOW PHENOMENA IN COMPRESSOR CASING TREATMENT
G. D. J. Smith and N. A. Cumpsty 1982 38 p refs
(CUED/A-Turbo/TR-112; ISSN-0309-6521) Avail: NTIS HC A03/MF A01

An axial skewed slot casing treatment was tested over the tips of an isolated low speed rotor with a hub-tip ratio of 0.4. An improvement in stall margin of 22% at nominal clearance was obtained. Detailed measurements of the loss pattern downstream of the rotor were made with a hot wire. Measurements were also made in the blade passage with a traversing gear moving with the rotor and in the treatment slots themselves using hot wires. The tentative conclusion is that unsteady effects in the slot are of secondary importance. Of primary importance is the selective removal of high absolute swirl, high loss fluid from the end wall near the trailing edge of the pressure surface of the blade and reintroduction of this, with absolute swirl direction reversed, near the blade leading edge. M.G.

N82-33662# Cambridge Univ. (England). Dept. of Engineering.
THE FLUID MECHANICS OF NON-NUCLEATING WET STEAM FLOWS
J. B. Young 1982 63 p refs
(CUED/A-Turbo/TR-111; ISSN-0309-6521) Avail: NTIS HC A04/MF A01

A semi-analytical, theoretical treatment of high speed, non-nucleating wet steam flows is presented and demonstrates both qualitatively and quantitatively the salient features of such flows. Departures from both thermal and inertial equilibrium occur, each characterized by an individual relaxation time, but in general thermal nonequilibrium effects dominate over inertial ones. The analysis shows that for flows characterized by a constant rate of expansion an initial transient phase (governed by the thermal relaxation time) is followed by a region of dynamic equilibrium where the degrees of nonequilibrium (the supercooling and slip velocity) remain approximately constant. The nonequilibrium parameters in the regime are shown to be functions of the pressure and expansion rate, as well as the relaxation times. If the expansion rate is continually changing the supercooling and slip velocity adjust to these changes (with an exponential lag) in an attempt to maintain a state of dynamic equilibrium. The departures from equilibrium are also characterized by a production of entropy which is responsible for the thermodynamic and inertial wetness losses

observed in steam turbines. Loss coefficients specifying these quantities are defined and the analysis shows how they may be calculated. M.G.

N82-33663*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPUTATION OF TWO-DIMENSIONAL TURBULENT FLOW AT SUBSONIC MACH NUMBERS OVER THICK TRAILING EDGES
Pius Drescher (Stanford Univ., Calif.) Aug. 1982 22 p refs
(NASA-TM-84278; A-9029; NAS 1.15:84278) Avail: NTIS HC A02/MF A01 CSCL 20D

An implicit time marching finite difference method is used to predict two dimensional turbulent flow at a Reynolds number of 440,000 and a Mach number of 0.574 over a shortened NACA 0012 airfoil with a trailing edge of 4.5% thickness and semicircular shape. The flow is found to be unsteady but periodic in the trailing edge region. Thus, lift and drag fluctuate at small amplitudes around mean values and at distinct frequencies. S.L.

N82-33664# Stanford Univ., Calif. Thermosciences Div.
THE STRUCTURE AND GROWTH OF THE MIXING LAYER REGION OF A ROUND JET
E. E. Bouchard, Jr. and W. C. Reynolds Mar. 1982 280 p refs
(Grant NSF ENG-76-13151)
(SU-TF-17) Avail: NTIS HC A13/MF A01

A submerged round jet was studied visually and quantitatively to determine the effects of time dependent perturbations in the initial jet velocity on the structure and growth of the mixing layer region of the jet. The experiments were performed on a water jet at a Reynolds number based on diameter of 5700. The shear layer at the lip of the nozzle was laminar, with a slope thickness of 0.034 diameters. Time dependent velocity perturbations were introduced uniformly over the exit of the nozzle producing the jet, thereby producing a jet with a nearly top hat instantaneous velocity profile and with a time dependent average velocity. The roll up of the laminar shear layer into ring vortices and the subsequent pairing interactions of these vortices were dramatically affected by forcing the jet. Furthermore, the growth of the jet in the mixing layer region was dependent on the merging of vortices. It was observed that without pairing there was virtually no growth. S.L.

N82-33665# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ACTA MECHANICA SINICA (SELECTED ARTICLES)
Ling Guocan and Yin Xieyuan 17 May 1982 72 p refs Transl. into ENGLISH from Acta Mechanica Sinica (China), no. 2, 1981 p 109-135, 181-186 and 194-198
(AD-A115634; FTD-ID(RS)T-0181-82) Avail: NTIS HC A04/MF A01 CSCL 20/4

Articles on the following topics are presented: the early stages of unsteady flow around a cylinder at high Reynolds number and under laminar conditions; methods for solving three dimensional flow in turbomachinery; numerical computation of viscous compressible flow in turbomachinery; a high speed interferograph system for investigating fast phenomena; and statistical simulation of the aerodynamic behavior of the transitional region of flow past combined bodies of revolution at arbitrary angles of attack. J.D.

N82-33666# Georgia Inst. of Tech., Atlanta.
INTERACTION OF OSCILLATIONS OF CHANNEL FLOW AND FLOW SEPARATION AT DUCT DISCONTINUITIES Final Report, Sep. 1979 - Aug. 1980
E. W. Price, J. E. Hubbartt, W. C. Strahle, E. A. Oguz, and P. M. Sagdeo Aug. 1981 34 p Presented at 17th JANNAF Combust. Meeting, Hampton, Va., Sep. 1980
(Contract N60530-79-M-DW93)
(AD-A116801; NWC-TP-6302) Avail: NTIS HC A03/MF A01 CSCL 13/11

The subject of vortex flow and coupling between vortices and acoustic wave motions in rocket motor chambers has become a topic of high interest to rocket motor stability specialists in the past several years. Although the phenomenon was first noted to be a significant factor in the stability of very large booster motors, recent experiences in tactical-sized motors indicate that vortex-acoustic wave interactions can become an important factor in determining acoustic wave amplitudes in all solid-propellant rocket motors, regardless of size. A two-dimensional experiment was used to study the flow fluctuations in the separated region resulting from a wall-slot-step (convergent step). This geometry corresponds to the geometry present in a segmented solid rocket motor in the region of the ends of adjoining segments. A modulated tunnel flow of controlled oscillation frequency was used, and the effect on flow fluctuations in the separated region was examined by hot-wire velocity measurements. The transfer function between free stream oscillations and separated flow fluctuations at the driven frequency was determined over a range of frequencies and main stream flow velocities. The transfer function exhibited a frequency dependence with maximum in the 10-25 Hz range, with the maximum occurring at higher frequency when the mean flow velocity was higher. Author (GRA)

N82-33667# Maryland Univ., Princess Anne.
TWO DIMENSIONAL VISCOUS FLOW OF A COMPRESSIBLE FLUID Final Report, Sep. 1980 - Jul. 1981
Kamesh Govindaraju 20 Oct. 1981 20 p refs
(Grant DAAG29-80-G-0011)
(AD-A116913; ARO-17610.1-MA-H; FR-1) Avail: NTIS HC A02/MF A01 CSCL 20/4

The Navier-Stokes equations for the two dimensional steady motion of a viscous compressible fluid are transformed to a system of equations in which the stream function is one of the two independent coordinates while the second coordinate is arbitrary. Vorticity, speed, density, pressure and the velocity gradient are the unknown functions of the equations. Three systems of equations are developed, all of them underdeveloped. The equations are applied to flows with pre-assigned forms and it is shown that if the stream lines are straight lines, they must be either parallel or concurrent and if the stream lines are involutes of a curve, then they must be concentric circles. Author (GRA)

N82-33668# Air Force Office of Scientific Research, Bolling AFB, Washington, D.C.
AFOSR RESEARCH MEETING ON DIAGNOSTICS OF REACTING FLOW Interim Report, Mar. 1981 - Feb. 1982
Feb. 1982 65 p refs Meeting held at Stanford Univ., Calif., 25-26 Feb. 1982
(AF Proj. 2308)
(AD-A117075; AFOSR-82-0514TR) Avail: NTIS HC A04/MF A01 CSCL 14/2

This document contains expanded abstracts from the 1982 meeting on the Air Force basic research program on diagnostics of reacting flow. The meeting (held at Stanford University on 25-26 February 1982) presented research directed at measuring temperatures, velocities, and concentrations in high performance combustion environments. (GRA)

N82-33669# Detroit Diesel Allison, Indianapolis, Ind.
SEPARATED DIFFUSER FLOW ANALYSIS, VOLUME 1 Final Report, 11 Aug. 1980 - 13 Jul. 1981
Harold L. Stocker, Thomas E. Scott, C. F. Shieh, and John E. Caruthers Wright-Patterson AFB, Ohio AFWAL Sep. 1981 63 p refs
(Contract F33615-80-C-2063; AF Proj. 3066)
(AD-A117668; DDA-EDR-10671; AFWAL-TR-81-2086-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 20/4

This report describes a finite difference computer program TASED (Turbulent Annular Sudden-Expansion Diffuser), which predicts flow properties in an axisymmetric annular duct of arbitrary shape which contains an arbitrarily shaped axisymmetric annular centerbody in the duct exit. The centerbody may contain openings through which air is allowed to flow. A two-equation TKL (Turbulent Kinetic Energy and Length Scale) turbulence model is used which was specifically developed for separated recirculation flows. The calculation procedure is programmed in the FORTRAN IV language and has operated successfully on the IBM 370, CDC,

CYBER 750, and DEC VAX 11/780 computers. This report presents the equations which form the analytical basis for the TASID computer program and describes the resulting computer program including the input preparation and the resulting computer program including the input preparation and the resulting output. A comparison is made between experimental data and calculated results for several test cases. GRA

N82-33670# Argonne National Lab., Ill.
INFLUENCE OF SULFATION-ENHANCED SALT ADDITIVES ON THE CORROSION BEHAVIOR OF MATERIALS IN ATMOSPHERIC FLUIDIZED-BED COMBUSTORS
O. K. Chopra, G. W. Smith, J. F. Lenc, K. M. Myles, and I. Johnson Dec. 1981 69 p refs
(Contract W-31-109-eng-38)
(DE82-010204; ANL/CEN/FE-80-18) Avail: NTIS HC A04/MF A01

Increased utilization of CaO can reduce the amount of limestone required for SO2 retention in atmospheric fluidized-bed combustion (AFBC) systems. A recently developed method of improving the utilization involves treating the limestone with various salts, such as NaCl, CaCl2, or Na2CO3. The influence of these sulfation-enhancement salt additives on corrosion of candidate structural materials for AFBC systems was investigated. Four 100-h and two 1000-h corrosion test runs were conducted in a 152-mm-ID fluidized bed coal combustor. In each run, three air cooled corrosion probes and four uncooled corrosion coupon holders, each with seven specimens were installed at various locations in the fluidized bed and freeboard sections of the combustor. The temperature of the corrosion specimens ranged from 400 to 8500 C. As controls, some of the runs were made without any salt additions. The results indicate that the presence of salt has no effect on the corrosion behavior of the various iron and nickel base alloys that were placed in the freeboard section of the combustor. Although the uncooled alloys within the fluidized bed do undergo oxidation/sulfidation corrosion, the addition of CaCl2 does not further affect the corrosion rate; the addition of NaCl or Na2CO3 increases the corrosion rates for the high nickel alloys, but not for the stainless steels. The observed corrosion rates for all of the alloys from within the fluidized bed containing approximately 2 mol% CaCl2 or Na2CO3 are in good agreement with the rates reported in other similar studies without salt additions. The corrosion data and a metallographic evaluation of the corrosion specimens are presented. DOE

N82-33671# West Virginia Univ., Morgantown. Dept. of Mechanical and Aerospace Engineering.
IN-SITU MEASUREMENT OF PARTICULATE IN TURBULENT DUCT FLOWS Final Report
R. A. Bajura, S. A. Lutz, J. B. Stenger, and J. G. Svinos Jan. 1982 53 p refs
(Contract DE-AM21-79MC-112284)
(DE82-010291; DOE/MC-11284/T11) Avail: NTIS HC A04/MF A01

Experiments were conducted using straight sampling probes to determine the errors in measuring the concentration of particulate in a flowing gas stream using non-isokinetic aspiration rates. The experiments were done in a 100 mm (4-in.) I.D. round pipe using a dual probe arrangement to obtain simultaneous measurements of the concentration under isokinetic and non-isokinetic conditions. Monodisperse aerosols were generated using glass beads in size ranges characterized by mass mean diameters of 3.0, 5.3, and 7.4 microns. Corresponding Stokes numbers varied in the range 0.02 to 0.24 for probes having internal diameters of 10.9 and 6.1 mm. The trends in the experimental data are in general agreement with the data for higher Stokes numbers reported previously in the literature and the results of a numerical analysis of aspiration flow into a thin-walled tube. Negligible differences were observed in the sampling accuracy when the probes were moved from the 0.50 to the 0.75 dimensionless radial location off the centerline of the test section. Effects due to the thickness of the sampling probes were observed for all tests with the general result that the concentration measurement was lower in value as the thickness of the probe was increased. DOE

N82-33672# Kernforschungszentrum, Karlsruhe (West Germany). Inst. fuer Neutronenphysik und Reaktortechnik.
VELOCITY AND TEMPERATURE PROFILES IN ROUGH ANNULI
L. Meyer Apr. 1981 90 p refs
(DE82-780258; KFK-3163) Avail: NTIS (US Sales Only) HC A05/MF A01; DOE Depository Libraries

Velocity and temperature profiles were measured in an annular flow cross section. Three different rough rods in two outer tubes each were investigated. The slopes of the nondimensional logarithmic velocity profile in both the inner rough zone and the outer smooth zone vary with the Reynolds number. The slopes of the nondimensional temperature profile deviate from a logarithmic line in a large portion of the flow cross section. The turbulent Prandtl number is smaller than one and varies with the distance from the wall. DOE

N82-33673# Pacific Northwest Lab., Richland, Wash.
ASSESSMENT OF EFFECTIVENESS OF GEOLOGIC ISOLATION SYSTEMS. ANALYTIC MODELING OF FLOW IN A PERMEABLE FISSURED MEDIUM
Otto D. L. Strack Feb. 1982 117 p refs
(Contract DE-AC06-76RL-01830)
(DE82-009289; PNL-4005) Avail: NTIS HC A06/MF A01

An analytic model was developed for two dimensional steady flow through infinite fissured porous media, and is implemented in a computer program. The model is the first, and major, step toward the development of a model with finite boundaries, intended for use as a tool for numerical experiments. These experiments may serve to verify some of the simplifying assumptions made in continuum models and to gain insight in the mechanics of the flow. The model is formulated in terms of complex variables and the analytic functions presented are closed-form expressions obtained from singular Cauchy integrals. An exact solution is given for the case of a single crack in an infinite porous medium. The exact solution is compared with the result obtained by the use of an independent method, which assumes Darcian flow in the crack and models the crack as an inhomogeneity in the permeability, in order to verify the simplifying assumptions. The approximate model is compared with solutions obtained from the above independent method for some cases of intersecting cracks. The agreement is good, provided that a sufficient number of elements are used to model the cracks. DOE

N82-33674# Virginia Univ., Charlottesville. School of Engineering and Applied Science.
INCOMPRESSIBLE FLOW IN A RAPIDLY ROTATING CYLINDER WITH A SOURCE/SINK DISTRIBUTION IN THE LATERAL WALL AND A FREE INNER BOUNDARY
R. J. Ribando Dec. 1981 21 p refs
(Contract DE-AC05-82OR-20900)
(DE82-011031; UVA-ER-705-81U) Avail: NTIS HC A02/MF A01

The flow of an incompressible fluid in a rapidly rotating right circular cylinder is considered. A source/sink mass distribution at the lateral wall, which is azimuthally uniform and symmetric across the midplane, causes a deviation from wheel flow. The container is only partially full and the inner free surface is allowed to deviate slightly from the vertical. A finite difference solution of the full nonlinear governing equations was used to obtain the flow field. A special implicit technique for the Coriolis terms which maintains geostrophy was developed to give a particularly fast algorithm. The results compare quite favorably with the linearized solution. DOE

N82-33675# California Univ., Livermore. Lawrence Livermore Lab.
CALORIMETRIC MEASUREMENTS OF EMITTANCE OF PIPE SURFACES: INFLUENCE OF ENCLOSURE DIAMETER, TEST PIPE LENGTH AND AN ARGON ATMOSPHERE
T. A. Reitter Oct. 1981 39 p refs

(Contract W-7405-eng-48)
(DE82-009404; UCRL-53213) Avail: NTIS HC A03/MF A01

Additional results using a calorimetric technique for measuring the total hemispherical emittance of pipe surfaces from 400 to 600 K are described. Two different Pyrex pipe enclosures were used, one of 15 cm i.d. and the other of 30 cm i.d. An error analysis showed that the larger diameter Pyrex pipe should have a smaller error, but the difference was negligible for the 4.4-cm test pipe diameter used. Measurements on a short length of a previously-measured pipe agreed with earlier measurements, but only over the temperature range of the measurements. While the technique normally uses a vacuum to minimize nonradiative heat transfer, measurements were done successfully with an argon atmosphere in a closed system. A nickel-plated pipe, measured first in a vacuum and then in an argon atmosphere, allowed calculation of an effective convective heat-transfer coefficient for use with test pipes of unknown emittances. Measurements done with an atmosphere have larger uncertainties than those done in vacuum. Measurements using this technique agreed with measurements made using a reflectance technique. It is believed that within the range of temperatures measured, emittance measurements made using the calorimetric technique have a relative error of no more than 10% when done in vacuum. DOE

N82-33676# California Univ., Livermore. Lawrence Livermore Lab.
DESIGN AND OPERATION OF AN APPARATUS FOR CALORIMETRIC EMITTANCE MEASUREMENTS OF PIPE SURFACES
T. A. Reitter Oct. 1981 23 p refs
(Contract W-7405-eng-48)
(DE82-008713; UCRL-53214) Avail: NTIS HC A02/MF A01

A technique for the measurement of the total hemispherical emittance of pipe surfaces is described, and design and operational details are given. The technique is conceptually simple. A long test pipe (e.g., 3.4 m) is mounted concentrically inside a Pyrex glass pipe. The system is evacuated, and the test pipe is heated by means of an electrical resistance heater. By varying the electrical power level, one can measure the test pipe emittance as a function of temperature. By using a simple correction to account for the finite length of the test pipe, one can calculate the results using the simple expression for infinite, concentric cylinders. Results agree with measurements by reflectance techniques and have a nominal relative error of less than 10%. DOE

N82-33677# Argonne National Lab., Ill. Components Technology Div.
AN ASSESSMENT OF HEAT-TRANSFER CORRELATIONS FOR TURBULENT WATER FLOW THROUGH A PIPE AT PRANDTL NUMBERS OF 6.0 AND 11.6
James J. Lorenz, David T. Yung, Chandrakant B. Panchal, and Gayle E. Layton Jan. 1982 14 p refs
(Contract W-31-109-eng-38)
(DE82-014426; ANL/OTEC-PS-11) Avail: NTIS HC A02/MF A01

An experimental investigation assessed the accuracy of existing heat-transfer correlations for turbulent flow of water in smooth tubes at Prandtl numbers (Pr) of 6.0 and 11.6. The best correlations were selected for use in designing ocean thermal energy conversion (OTEC) heat exchangers. Two shell-and-tube heat exchangers, a plain-tube evaporator and a plain-tube condenser, were tested to obtain data for water at Pr = 6.0 (800 F) and Pr = 11.6 (400 F), respectively. From measured values of the overall heat-transfer coefficients, the water-side coefficients were determined by the Wilson plot method. The results were used as a data base for evaluating seven widely used heat-transfer correlations. Overall, the best correlations were found to be Petukhov-Popov and Sleicher-Rouse, both of which agree within + or - 5% with the experimental data over the entire Reynolds number range. The Dittus-Boelter and Sieder-Tate correlations, popular with heat-transfer engineers, underpredict the data by 5% to 15% and thus are considered too conservative. Predictions from the Kays correlation compare favorably with the data at Pr = 6.0 but are slightly high (nonconservative) at Pr = 11.6. The Eagle Ferguson correlation is acceptable at Pr = 6.0 but a little too conservative at Pr = 11.6. DOE

N82-33678# New York Univ., New York. School of Mathematics.
EXISTENCE OF A GLOBAL WEAK SOLUTION TO THE NONLINEAR WATERHAMMER PROGRAM
Mitchell Luskin and Blake Temple (Rockefeller Univ.) New York New York Univ. Dec. 1981 60 p refs
(Contract DE-AC02-76ER-03077; Grants NSF MCS-81-01631; NSF MCS-80-17157)
(DE82-010717; DOE/ER-03077/174) Avail: NTIS HC A04/MF A01

The existence of global weak solutions to an initial boundary value problem for a nonlinear hyperbolic system which models fluid flow in a pipe is proven. The effect of friction is modeled by adding a quadratic zero order term to the system of conservation laws for compressible, frictionless flow. Priori bounds are obtained by means of a nonincreasing functional that is compatible with the friction effects. The boundary values for this problem cannot be imposed weakly, so results on the regularity of the solution at the boundary are given. DOE

N82-33679# National Bureau of Standards, Boulder, Colo.
COMPUTATION OF TWO-DIMENSIONAL TIME-DEPENDENT NATURAL CONVECTION OF COMPRESSIBLE FLUID IN A RECTANGULAR ENCLOSURE
H. Yamashita and V. D. Arp Mar. 1982 46 p refs
(PB82-198797; NBSIR-82-1660) Avail: NTIS HC A03/MF A01 CSCL 20D

Studies of natural convection processes generally assume an incompressible fluid wherein the density is a function of temperature only (the Bousinesq approximation). However, local pressure gradients caused by rapid variations in the heated wall temperature cannot be described within this approximation. These time-varying gradients cause fluid motions which perturb the quasi-static natural convection process. A numerical analysis procedure which includes compressibility effects and allows computation of transient fluid motions during onset of natural convection is described. Details of the computational procedure and preliminary results for one geometry are given. Author

N82-33680# Iowa Univ., Iowa City. Inst. of Hydraulic Research.
STUDY OF PERIODIC TURBULENT PIPE FLOW
B. R. Ramaprian and Shuen-Wei Tu Jan. 1982 463 p refs
(Contract DAAG29-79-G-0017)
(PB82-201534; IIHR-238) Avail: NTIS HC A20/MF A01 CSCL 20D

Oscillatory turbulent flow in a 50 mm diameter pipe at an average velocity of 1 m/s was studied experimentally and numerically. Instantaneous velocity and wall shear stress were measured using a frequency shifted laser Doppler anemometer and a flush mounted hot film surface gage. The data obtained include turbulent intensities, Reynolds shear stress, energy spectra and autocorrelations. Two oscillation frequencies, (0.5 Hz and 3.6 Hz) were studied. The higher frequency is of the order of the turbulent bursting frequency in the flow. The lower frequency can be considered to be an 'intermediate' frequency. At the high frequency, the time mean properties are found to be affected by the imposed oscillation. At 0.5 Hz, these properties are not significantly affected. The turbulent structure of the flow, however, is significantly affected at both the frequencies and is considerably different from that in quasisteady flow. Based on this study, it is possible to classify unsteady flows into five different regimes. The validity of 'quasisteady' turbulence modeling in the prediction of these flows is examined with reference to each of these regimes. A.R.H.

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N82-33681*# National Aeronautics and Space Administration. Pasadena Office, Calif.
LOW NOISE LEAD SCREW POSITIONER Patent Application
Gerald S. Perkins, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 30 Jul. 1982 11 p Sponsored by NASA (Contract NAS7-100)
(NASA-Case-NPO-15617-1; US-Patent-Appl-SN-403849) Avail: NTIS HC A02/MF A01 CSCL 14B

A very precise and low noise lead screw positioner, for positioning a retroreflector in an interferometer is described. A gas source supplies inert pressurized gas, that flows through narrow holes into the clearance space between a nut and the lead screw. The pressurized gas keeps the nut out of contact with the screw. The gas flows axially along the clearance space, into the environment. The small amount of inert gas flowing into the environment, avoid pollution. By allowing such flow into the environment, no seals are required between the end of the nut and the screw, which would cause noise (small irregular movements) as the screw turned. NASA

N82-33682# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
DESIGN AND EVALUATION OF A PRESSURE SENSOR FOR HIGH TEMPERATURE NUCLEAR APPLICATION
Merlin E. Yancey Nov. 1981 36 p refs
(Contract DE-AC07-76ID-01570)
(EGG-2135) Avail: NTIS HC A03/MF A01

A small eddy current pressure sensor for use within a high temperature nuclear environment was designed for use at pressures and temperatures of up to 17.23 MPa and 650 F. The design of the sensor incorporated features to minimize possible errors due to temperature transients present in nuclear applications. The prototype pressure sensor, the associated 100 kHz signal conditioning electronics, and the evaluation tests which were conducted are described. A.R.H.

N82-33683*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
OPTICAL STUDIES OF MODEL BINARY MISCIBILITY GAP SYSTEM
L. L. Lacy (Exxon Production Research Co.), W. K. Witherow, B. R. Facemire, and G. M. Nishioka (Owens Corning Fiberglass Co., Granville, Ohio) Jun. 1982 54 p refs
(NASA-TM-82494; NAS 1.15:82494) Avail: NTIS HC A04/MF A01 CSCL 14E

In order to develop a better understanding of separation processes in binary miscibility gap metal alloys, model transparent fluid systems were studied. The system selected was diethylene glycol-ethyl salicylate which has convenient working temperatures (288 to 350 K), low toxicity, and is relatively easy to purify. The system is well characterized with respect to its phase diagram, density, surface and interfacial tensions, viscosity and other pertinent physical properties. Studies of migration of the dispersed phase in a thermal gradient were performed using conventional photomicroscopy. Velocities of the droplets of the dispersed phase were measured and compared to calculated rates which included both Stokes and thermal components. A holographic microscopy system was used to study growth, coalescence, and particle motions. Sequential holograms allowed determination of particle size distribution changes with respect to time and temperature. Holographic microscopy is capable of recording particle densities up to 10 to the 7th power particles/cu cm and is able to resolve particles of the order of 2 to 3 microns in diameter throughout the entire volume of the test cell. The reconstructed hologram produces a wavefront that is identical to the original wavefront as it existed when the hologram was made. The reconstructed wavefront is analyzed using a variety of conventional optical methods. M.G.

N82-33684# Delta Information Systems, Inc., Jenkintown, Pa.
GRAPHIC/SYMBOL SEGMENTATION FOR GROUP 4 FACSIMILE SYSTEMS Final Technical Information Bulletin
Alan R. Deutermann Washington, D.C. National Communications System 1 Apr. 1982 124 p refs
(Contract DCA100-81-C-0024)
(AD-A117026; NCS-TIB-82-2) Avail: NTIS HC A06/MF A01 CSCL 14/3

The purpose of this study was to examine possible techniques for and symbol areas, and assemble a code that represents the entire document. Parameters to be considered include compression, commonality with facsimile and TELETEX* transmissions, and complexity of implementation. Six segmentation technique were selected for analysis. The techniques were designed to differ from each other as much as possible, so as to display a wide variety of characteristics. For each technique, many minor modifications would be possible, but it is not expected that these modifications would alter the conclusions drawn from the study. GRA

N82-33685# Honeywell Corporate Technology Center, Bloomington, Minn.
ELECTRON BEAM GENERATED HOLOGRAPHIC OPTICAL ELEMENT RESEARCH Annual Technical Report, 1 Jan. - 31 Dec. 1981
Steven M. Arnold Washington, D.C. AFOSR May 1982 26 p
(Contract F49620-80-C-0029; AF Proj. 2305)
(AD-A117052; AFOSR-82-0566TR) Avail: NTIS HC A03/MF A01 CSCL 20/6

This report describes progress of the e-beam generated holographic optical element research program during 1981. We investigated partitioned computer generated holographic masks for optical matrix-vector multiplication. These masks are partitioned into separate areas for each channel, with each of these areas containing a linear grating to diffract light to its designated detector. A single lens completes the optical system. The space variant properties of the mask allow post-fabrication trimming for amplitude control. We have demonstrated the optical equivalent of a 1 x 10 matrix operation. In separate experiments, we have encoded matrices with numerical accuracies of 20 dB and a numerical range of 37 dB. These results were limited primarily by the stability of the input light source. Author (GRA)

N82-33686# New Mexico Univ., Albuquerque. Engineering Research Inst.
BLEST IMPULSE TIME-OF-FLIGHT SPHERE Final Report
H. Gay Kirtland AFB, N. Mex. AFWL May 1982 30 p refs Sponsored in part by Defense Nuclear Agency
(Contract F29601-81-C-0013)
(AD-A116940; NMERI-TA10-6; AFWL-TR-81-147) Avail: NTIS HC A03/MF A01 CSCL 19/1

A time-of-flight sphere was designed, fabricated, and tested to be used to measure impulse delivered by a Berm-Loaded Explosive Simulation Test (BLEST). The timer inside the thin-wall ball was tested for survival by performing drop tests and explosively propelled tests. The takeoff velocity determined from time of flight correlated very closely with the velocity determined by high-speed cameras and photopoles. Author (GRA)

N82-33687# Army Engineer Topographic Labs., Fort Belvoir, Va.
APPLYING PHOTOGRAMMETRY TO REAL TIME COLLECTION OF DIGITAL IMAGE DATA
William A. Baracat and Michael A. Crombie Nov. 1981 41 p
(DA Proj. 4A7-62707-A-855)
(AD-A116770; ETL-0275) Avail: NTIS HC A03/MF A01 CSCL 09/2

The practicality of converting digital and stereo image data into terrain elevation data in real time is investigated. Results indicated that the real time collection of elevation data using epipolar correlation methods is not feasible. It is shown that real time mensuration of 7-parallax can be used as a means to help maintain a desired relative orientation in a variety of digital collection system. Author (GRA)

N82-33688# Dynamics Technology, Inc., Torrance, Calif.
DESIGN AND LABORATORY TESTING OF A PROTOTYPE LINEAR TEMPERATURE SENSOR Final Report, 1 Jan. - 30 Jun. 1982
C. Michael Dube and Christian M. Nielsen 1 Jul. 1982 66 p refs
(Contract N00014-82-C-0122)
(AD-A117245; DT-8203-01) Avail: NTIS HC A04/MF A01 CSCL 08/10

This report discusses the basic theory, design, and laboratory testing of a prototype linear temperature sensor (or 'line sensor'), which is an instrument for measuring internal waves in the ocean. The operating principle of the line sensor consists of measuring the average resistance change of a vertically suspended wire (or coil of wire) induced by the passage of an internal wave in a thermocline. The advantage of the line sensor over conventional internal wave measurement techniques is that it is insensitive to thermal finestructure which contaminates point sensor measurements, and its output is approximately linearly proportional to the internal wave displacement. An approximately one-half scale prototype line sensor module was teste in the laboratory. The line sensor signal was linearly related to the actual fluid displacement to within 10%. Furthermore, the absolute output was well predicted (within 25%) from the theoretical model and the sensor material properties alone. Comparisons of the line sensor and a point sensor in a wavefield with superimposed turbulence (finestructure) revealed negligible distortion in the line sensor signal, while the point sensor signal was swamped by 'turbulent noise'. The effects of internal wave strain were also found to be negligible. GRA

N82-33689# Michigan Univ., Ann Arbor.
WHITE LIGHT OPTICAL PROCESSING AND HOLOGRAPHY Final Report, 14 Jun. 1977 - 14 Aug. 1981
Emmett Leith Oct. 1981 91 p refs
(Grant AF-AFOSR-3356-77; AF Proj. 2305)
(AD-A117506; AFOSR-82-0485TR; Rept-4) Avail: NTIS HC A05/MF A01 CSCL 20/6

Methods for white light optical processing are reported. Convolution, including deblurring, in white light are described. Also described are methods for introducing a white light reference beam by means of an achromatic 3-grating interferometer, thus allowing a complex output to be recorded as a hologram. Experimental results are shown. Author (GRA)

N82-33690# Aeronautical Research Labs., Melbourne (Australia). Dept. of Defence Support.
A SPECTRUM ANALYSER FOR ACOUSTIC EMISSION
I. G. Scott Jun. 1982 17 p refs
(AD-A117720; ARL-MAT-TM-382; AR-002-887) Copyright. Avail: NTIS HC A02/MF A01 CSCL 14/2

Frequency analysis of acoustic emission (AE) involves the capture and analysis, or real-time analysis, of an impulsive or non-repetitive signal. The present ARL procedure involves the use of a transient recorder and conventional heterodyne spectrum analyser, and no more than one event per five seconds can be handled. Even with the adoption of a strict sampling procedure, much information is lost, particularly during the important periods of intensive AE activity. Upton (1977) discussed the use of the heterodyne analyser, of parallel analogue or digital filters, and of the FFT algorithm. Commercial equipment based on these principles is available but expensive. Clark and Mathieson (1977), and Graham (1979), used matched sets of band-pass filters whose centre frequencies were related by a fixed ratio. This method of spectral analysis is fast, provides an output suitable for handling by a computer and, by restricting the number of bands, suppresses much unwanted detail in the spectrum. It was chosen for laboratory development and was constructed from available cheap components. Author (GRA)

N82-33691# FWG Associates, Inc., Tullahoma, Tenn.
ANALYSIS OF A KITE ANEMOMETER Final Report
K. H. Huang, Chih-Fang Shieh, and Walter Frost Dec. 1981 62 p refs
(Contract DE-AC06-76ET-20242)
(DE82-009058; DOE/ET-20242/81/2) Avail: NTIS HC A04/MF A01

Equations of motion for a rigid, tailless kite and tether system are derived from free body diagrams. A direct, analytical solution of these equations provides tether tension in a steady wind. Numerical solutions of linearized equations of motion provide the kite tether tension in a transient, turbulent wind field. A similar analysis is applied to a kite-tail-tether system. The results of these analyses show that line tension at the ground anchor is within a few percent of tether tension at the kite. Wind shear does not significantly affect line tension. Thus the tethered kite anemometer can measure height-dependent wind fields based on steady-state, uniform wind calibrations. Unsteady winds also have an insignificant effect on the tether if gust amplitude and frequency are such that tether accelerations are below 9.8m/s(2). In a variable wind, tether tension is in phase with wind variations. Tension amplitude is dependent on the magnitude and frequency of wind variations. DOE

N82-33692# Department of Energy, Pittsburgh, Pa. Energy Technology Center.
APPARATUS DEVELOPMENT FOR MEASURING HEAT FLUX IN A DIRECT COAL-LIQUEFACTION PREHEATER
R. M. Kornosky, M. Perlmutter, W. Fuchs, and J. A. Ruether Apr. 1982 68 p refs
(DE82-012013; DOE/PETC/TR-82/8) Avail: NTIS HC A04/MF A01

A device is evaluated for determining heat flux in a direct coal liquefaction preheater. The heat fluxmeter determines heat flux from measurements of temperature difference across the preheater tube wall at a given plane perpendicular to the tube axis. Six fluxmeters were installed in a 5.08 m length of nominal 1 1/2 inch diameter, schedule XX pipe enclosed in stacked electric furnaces. Heat flux to a heat transfer fluid flowing through the pipe was measured and compared to values predicted by the fluxmeters. Fair agreement was observed, and the method can be used as an empirical calibration procedure for fluxmeters. A number of apparatus improvements were identified that will be incorporated in the planned experimental program. DOE

N82-33693# Leeds and Northrup Co., North Wales, Pa.
PARTICULATE-ANALYSIS INSTRUMENTATION FOR SYSTEMS
E. S. VanValkenburg Sep. 1981 36 p refs
(Contracts DE-AC01-76ET-10374; EX-76-C-01-2412)
(DE82-012464; DOE/ET-10374/199) Avail: NTIS HC A03/MF A01

An optical instrument for in situ measurement of particle loadings and size distributions in the product gas of fluidized bed combustion is described. A prototype instrument was designed, constructed and then evaluated on bench scale and pilo systems. This instrument utilizes low angle forward scattering of light from particles illuminated by a laser. The instrument is not a particle counter. Rather, it collects scattered light continuously and simultaneously from all particles passing through the laser beam. The across-duct measurements of the scatter flux are converted to particle size and concentration data via an integral microcomputer. This instrument was tested on the Argonne National Laboratory fluidized bed combustor and on the Small Gas Turbine system at the Curtiss Wright Corporation. Comparison of optical measurements show good correlation with data from cascade impactors. Thus, it is concluded that aerodynamic and optical sizing of particles are comparable, at least for those cases where the size distributions are log normal. DOE

N82-33694# Bureau of Radiological Health, Rockville, Md. Div. of Electronic Products.
PERFORMANCE EVALUATION OF RF ELECTRIC AND MAGNETIC FIELD MEASURING INSTRUMENTS Final Report
Billy C. W. Nesmith and Paul S. Ruggers Mar. 1982 36 p refs (PB82-195009; FDA/BRH-82/59; FDA-82-8158) Avail: NTIS HC A03/MF A01 CSCL 14B

The need to quantify the electromagnetic fields emitted by industrial, scientific, or medical (ISM) products operating in the 10 to 300 MHs region requires the testing of instrumentation suitable for use in RF radiation hazard surveys. To meet this requirement, several procedures were devised to test the accuracy of the RF survey instrumentation. Measurement systems and protocols were developed and evaluated. The electric (E) an magnetic (H) field measuring instruments were tested for linearity, calibration accuracy, amplitude modulation response, directivity, antenna patterns, temperature response, drift and noise, radiofrequency interference and polarization response. Tests were performed on three commercially available RF survey instruments and a one-of-a-kind device over the 10 to 100 MHs region. Complete tests were only performed at the ISM frequency of 27.12 MHs. Errors for each of the tests are presented in tabular form. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-33695# Norwegian Defence Research Establishment, Kjeller.
CONTINUOUSLY-TUNABLE HIGH-REPETITION RATE RF-EXCITED CO2 WAVEGUIDE LASER
Stian Lovold Jul. 1982 100 p refs
(NDRC/PUBL-82/1002) Avail: NTIS HC A05/MF A01

The concept of pumping a CO2 laser with a radio frequency discharge at multiatmospheric pressures in order to obtain continuous frequency tuning was investigated both theoretically and experimentally. Experimentally 40.68 MHz RF excitation of discharges between parallel plate electrodes with up to 7 to 8 peak RF power was investigated. Emphasis has been laid on how to attain a stable glow discharge with sufficiently long duration before arcing for integration of enough RF power in the discharge to reach threshold for laser oscillation was emphasized. A 10 atm RF excited CO2 waveguide laser was developed. With no dispersive elements in the laser resonator and with a 2% output coupler, input RF power threshold for laser oscillation was 2 kW at 10 atm. Peak output power was 1.5 kW for 7 to 8 kW input RF power. The output pulse has the form of approximately 300 ns duration gain switcheed pulse followed by a tail at lower power. An efficiency (input RF energy/laser output energy) of 2% was measured for the gain switched pulse. The laser was operated with pulse repetition rates in excess of 1 kHz, limited primarily by the available gas flow capacity. Continuous frequency tuning between the R(12) and R(14) lines in the 10.4 micron band was demonstrated. S.L.

N82-33696*# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
STUDY OF LASER HEATED PROPULSION DEVICES. PART 1: EVALUATION OF LASER DEVICES, FUELS AND ENERGY COUPLING MECHANISMS Final Report
Owen C. Hofer Apr. 1982 77 p refs
(Contract NAS8-33974)
(NASA-CR-170625; NAS 1.26:170625;
LMSC-HREC-TR-D784744-Pt-1) Avail: NTIS HC A05/MF A01 CSCL 20E

Closed cycle, CW waveform and short wavelength laser devices are desirable characteristics for laser propulsion. The choice of specific wavelengths for hydrogen fuel affects the operational conditions under which a laser supported absorption (LSA) wave is initiated and maintained. The mechanisms of initiating and maintaining LSA waves depend on the wavelength of the laser. Consequently, the shape and size of the hot core plasma is also dependent on wavelength and pressure. Detailed modeling of these mechanisms must be performed before their actual significance can be ascertained. Inverse bremsstrahlung absorption mechanism is the dominant mechanism for coupling energy into the plasma, but other mechanisms which are wavelength dependent can dictate the LSA wave plasma initiation and maintenance conditions. Multiphoton mechanisms become important at visible or shorter wavelengths. These are important mechanisms in creating the initial H2 gas breakdown and supplying the precursor electrons required to sustain the plasma. S.L.

N82-33697*# Lockheed Missiles and Space Co., Huntsville, Ala.
STUDY OF LASER HEATED PROPULSION DEVICES. PART 2: ASSESSMENT OF LASER PROPULSION MODELING AND SIMULATION REQUIREMENTS Final Report
Juergen Thoenes Apr. 1982 41 p refs
(Contract NAS8-33974)
(NASA-CR-170626; NAS 1.26:170626;
LMSC-HREC-TR-D784744-Pt-2) Avail: NTIS HC A03/MF A01 CSCL 20E

Theoretical models for the laser heated thruster are reviewed. The requirements for an improved laser heated thruster theoretical model are discussed. The application of a time dependent finite difference Navier-Stokes equation solution to the laser heated thruster problem is described, along with a simple closed form solution which was developed in order to gain insight into the difficulties encountered in the pursuit of the numerical solution. S.L.

N82-33698*# Applied Research, Inc., Huntsville, Ala.
BETA EXPERIMENT FLIGHT REPORT Progress Report
Aug. 1982 29 p refs
(Contract NAS8-34337)
(NASA-CR-170622; NAS 1.26:170622) Avail: NTIS HC A03/MF A01 CSCL 20E

A focused laser Doppler velocimeter system was developed for the measurement of atmospheric backscatter (beta) from aerosols at infrared wavelengths. The system was flight tested at several different locations and the results of these tests are summarized. S.L.

N82-33699*# Applied Research, Inc., Huntsville, Ala.
BETA EXPERIMENT Final Report
Jun. 1982 170 p refs
(Contract NAS8-34337)
(NASA-CR-162087; NAS 1.26:162087) Avail: NTIS HC A09/MF A01 CSCL 20E

A focused laser Doppler velocimeter (LDV) system was developed for the measurement of atmospheric backscatter (beta) from aerosols at infrared wavelengths. A Doppler signal generator was used in mapping the coherent sensitive focal volume of a focused LDV system. System calibration data was analyzed during the flight test activity scheduled for the Beta system. These analyses were performed to determine the acceptability of the Beta measurement system's performance. S.L.

N82-33700# Naval Research Lab., Washington, D. C.
ELECTRON DRIFT IN A LINEAR MAGNETIC WIGGLER WITH AN AXIAL GUIDE FIELD
J. A. Pasour, F. Mako, and C. W. Roberson 18 Jun. 1982 24 p refs
(RR0110941)
(AD-A115739; NRL-MR-4791) Avail: NTIS HC A02/MF A01 CSCL 20/5

Electron trajectories through a linear magnetic wiggler in an axial guide field are calculated numerically. Off-axis electrons are shown to drift in a direction perpendicular to the wiggler field because of the wiggler gradient. Effects of self fields and initial conditions are analyzed, and the results are compared to those obtained with a helical wiggler. An empirical analytic expression for the linear wiggler drift is presented, and means of stabilizing the drift are discussed. Author (GRA)

N82-33701# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
WAVEGUIDE GAS LASER
Cheng Zedong 26 May 1982 25 p refs Transl. into ENGLISH from Wuli (China), v. 10, no. 6, Jun. 1981 p 337-344
(AD-A115648; FTD-ID(RS)T-0356-82) Avail: NTIS HC A02/MF A01 CSCL 20/5

Waveguide gas lasers are described. Transmission loss of hollow tube light waveguides, coupling loss, the calculation of output power, and the width of the oscillation belt are discussed. The structure of a waveguide CO2 laser is described. J.D.

N82-33702# California Univ., Santa Barbara. Quantum Inst.
DESIGN OF THE UCSB FEI ELECTRON BEAM SYSTEM
Luis R. Elias and Gerald Ramian 28 Oct. 1981 30 p refs Sponsored in part by AFOSR
(Contract N00014-80-C-0308)
(AD-A115937; QIFEL-011-81) Avail: NTIS HC A03/MF A01 CSCL 20/7

The UCSB FEL experimental program was initiated January 15, 1980 at the Quantum Institute of the University of California at Santa Barbara. It's principal objective is to demonstrate the operation of electrostatic-accelerator free-electron lasers in (1) the FIR-submillimeter region at high average power and high overall efficiency using a single stage FEL; and (2) the visible-IR region with modest power and modest overall efficiency using a two-stage FEL. An important feature of the UCSB FEL is the recovery of the spent electron beam. Both (1) the average laser power and (2) the overall efficiency of the FEL increase with increased electron beam collection efficiency. Optimum laser performance can be achieved with this device provided only a small fraction of the total electric charge stored in the beam is lost while transporting it through the system. Realization of this low charge loss condition can be achieved only if a very high quality electron beam can be produced and maintained throughout the electron accelerator and transport system. GRA

N82-33703# Harry Diamond Labs., Adelphi, Md.
NEAR MILLIMETER WAVE RADIATION FROM A GYROMONOTRON
Joseph D. Silverstein 18 Jun. 1982 14 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117301) Avail: NTIS HC A02/MF A01 CSCL 20/7

Reasonably powerful and efficient first harmonic oscillations have been obtained from this gyrotron at values of beam current, applied magnetic fields, and frequencies mostly consistent with the linear gyrotron theory. This implies that the predictions for cavity Q times threshold power from the theory are, at least approximately, correct for the first harmonic. On the other hand the second harmonic oscillations predicted by this theory were not observed for the cavity geometry. One must conclude that either the theory is not equally as reliable for second harmonic interactions, or that the Q values for the modes in the present cavity are much lower than those estimated in Table 1. Measurements of threshold power and of cavity Q will hopefully help clarify the issue and eventually lead to efficient second harmonic radiation from this gyrotron. GRA

N82-33704# Naval Research Lab., Washington, D. C.
THE EFFECTS OF TRANSVERSE GRADIENT OF STATIC MAGNETIC WIGGLERS ON THE FREE ELECTRON LASER Interim Report
Cha-Mei Tang 30 Jun. 1982 20 p refs
(DARPA Order 3817)
(AD-A116968; NRL-MR-4820) Avail: NTIS HC A02/MF A01 CSCL 20/5

The static magnetic wiggler fields of the free electron laser possesses transverse gradients, which cause betatron oscillations. We derived the electron trajectories in the wiggler field. The betatron oscillations cause an effective axial velocity spread. We obtained the condition for the input radiation field to initially trap all the electrons. We found that the minimum requirement on the input radiation power density to initially trap all electrons for a helical wiggler is one quarter of that for a linear wiggler for beams possessing identical emittance. Author (GRA)

N82-33705# Army Missile Command, Redstone Arsenal, Ala.
A NEW MIDINFRARED LASER IN HYDROGEN
Thomas A. Barr, Jr. and W. B. McKnight 18 Jun. 1982 14 p refs Presented at the Army Sci. Conf. 15-18 Jun. 1982
(AD-A117162) Avail: NTIS HC A02/MF A01 CSCL 20/5

The basic research program for high energy lasers (HEL) at the U.S. Army Missile Command has had a major task in the area of new laser concepts for future Army HEL applications. A theoretical and experimental program to explore the possibility for developing a storage laser in hydrogen was carried out during FY 80-82 and resulted in the discovery of the laser reported here. The research program on hydrogen as a storage laser for high energy lasers applications has shown that HD certainly cannot be made into a storage laser under the operating conditions we had and perhaps cannot be so made under any circumstance. No conclusion was reached concerning H2/HCl or D2/HCl since serendipity produced a new set of lasers in the course of experiments on these gas mixtures. The new lasers, identified at least in hydrogen as being in the triplet states, may be the first step in successful demonstration of the hydrogen excimer. GRA

N82-33706# Army Missile Command, Redstone Arsenal, Ala. Research Directorate.
MICOM PROGRAM IN LIGHT CONTROL BY LIGHT
Charles M. Bowden 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117159) Avail: NTIS HC A02/MF A01 CSCL 20/5

In this paper, we present calculational results and analysis for the effects of coherent pump dynamics, propagation, transverse and diffraction effects on SF emission from an optically-pumped three-level system. The full nonlinear, co-propagational aspects of the inject pump pluse, together with the SF which evolves are explicitly treated in the calculation. Not only do our results relate strongly to previous calculations and experimental results in SF, but we introduce and demonstrate a new concept in nonlinear light-matter interactions, which we call light control by light. We show how characteristics of the SF can be controlled by specifying certain characteristics of the injection pulse. This leads to possible applications in laser pulse control and shaping, nonlinear optical information encoding, and unique pulsed LADAR and millimeter wavelength sources. GRA

N82-33707# Wisconsin Univ., Madison. Dept. of Physics.
PULSED EXCITATION AND COLLISIONAL PROCESSES Final Report, 1 Jan. 1978 - 31 Mar. 1982
L. W. Anderson and C. C. Lin 29 Apr. 1982 45 p refs
(Contract F19628-78-C-0042; AF Proj. 2310)
(AD-A116937; AFGL-TR-82-0139) Avail: NTIS HC A03/MF A01 CSCL 20/6

The method of pulsed excitation is used to study the rates of population and de-population of energy levels of molecules. Optical measurements are made with the aid of laser-spectroscopic techniques. Application to a helium discharge yields collisional quenching rates. Preliminary studies on nitrogen molecules are reported. Author (GRA)

N82-33708# Army Armament Research and Development Command, Dover, N. J. Fire Control and Small Caliber Weapon Systems Lab.
CO2 LASER WAVEGUIDING IN GaAs MBE LAYERS
Howard A. Jenkinson and John M. Zavada 18 Jun. 1982 10 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117394) Avail: NTIS HC A02/MF A01 CSCL 20/5

In this report, experimental analyses of the electronic and optical properties of a prototype single layer MBE (Molecular Beam Epitaxy) waveguide are presented. A polished (100) wafer of n(+)-GaAs heavily doped with silicon was used as the waveguide substrate. The free carrier concentration was approximately 3 x 10 to the 18th power/cc. An epitaxial layer of n-GaAs lightly doped with tin was then grown on the substrate. The carrier concentration

of the epitaxial layer was targeted to be 3 - 5 x 10 to the 15th power/cc. GRA

N82-33709# New Mexico Univ., Albuquerque. Inst. for Modern Optics.
STUDY OF MOLECULAR COLLISION DYNAMICS FOR CHEMICAL LASER SYSTEMS Final Technical Report, 1 Aug. 1980 - 31 Oct. 1981
John C. Bellum and Michael Burrows Mar. 1982 16 p refs
(Grant AF-AFOSR-0261-80; AF Proj. 2301)
(AD-A117938; AFOSR-82-0551TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

This report presents a summary of the research performed from 1 August 1980 - 31 October 1981 under Grant AFOSR - 80 -0261. Part 1 of the report deals with the theoretical studies of molecular collision dynamics in connection with chemical laser mechanisms, and Part 2 deals with experimental studies of chemical laser pumping by explosive reactions. Author (GRA)

N82-33710# EIC, Inc., Newton, Mass.
DEVELOPMENT OF HOST CRYSTALS FOR Ce(+3) BLUE AND BLUE-GREEN SOLID-STATE LASERS Final Report, 1 Jan. - 30 Jun. 1982
R. David Rauh and A. Nancy Scoville Jul. 1982 32 p refs
(Contract N00014-82-C-0142; NR Proj. 379-052)
(AD-A117899; C-686) Avail: NTIS HC A03/MF A01 CSCL 20/2

Blue-green lasers operating at equivalent 480 nm, a region of sea water transparency, could become an integral part of undersea and air to sea communication and imaging systems. During Phase 1 of this program, wide band gap oxides were examined which could support Ce+3 luminescence in this region. A basic requirement for observing Ce+3 d yields f luminescence in this region is a cubic site symmetry as is found in the Th+4 or Ce+4 position of THO2 and CeO2, or the La+3 position of LaAl03 and LaAl1-xScx03 (perovskites). These oxides were synthesized, doped with Ce+3, using either oxidation of mixed oxalates for THO2.Ce, or a combination of component oxides in a molten BaCO3/BaF2 flux for the perovskites. Total luminescence spectra of the oxides revealed a two componenet fluorescence between 400 and 500 nm in all cases, with two excitation maxima between 320 and 380 nm. Some contribution to the spectra from Ce+4 or from an impurity defect center could not be ruled out. A concerted effort on production of optical quality specimens of the promising materials, either as clear ceramics or single crystals, is recommended for Phase 2 of this investigation so that they may be evaluated as lasers. Author (GRA)

N82-33711# Bendix Corp., Kansas City, Mo. Technical Communications Dept.
RESOLUTION OF CONTAMINATION PROBLEMS AFFECTING LASER SURFACE CERTIFICATION INSPECTION
L. C. Jackson Mar. 1982 21 p
(Contract DE-AC04-76DP-00613)
(DE82-008775; BDX-613-2770) Avail: NTIS HC A02/MF A01

Contamination from particulate and organic residues which interfered, with the laser surface certification (LSC) inspection of some parts was found to come from three sources: particulate and organic residues from polishing compounds; organic films from cleaning solvents; and particles and organic residues transferred from plastic fixtures used to process these parts. The manufacturing cleaning process was not effective in removing all polishing compound residues, and an extensive cleaning procedure was developed using two solvents in a multicycle ultrasonic/vapor degreasing procedure. Parts were then subjected to gas plasma cleaning which removed the organic films left by the solvent cleaning. Plastic and rubber materials were evaluated for their contamination transfer characteristics; a fluorocarbon elastomer was the least contaminating. Inspection data established the efficacy of the cleaning procedure. After design relaxation, a single stage ultrasonic vapor degreasing process was used to achieve product acceptance. DOE

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-33712*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DIFFUSER/EJECTOR SYSTEM FOR A VERY HIGH VACUUM ENVIRONMENT Patent Application
Kenneth E. Riggs and Carl J. Wojciechowski, inventors (to NASA) (Lockheed Missiles and Space Co., Huntsville, Ala.) Filed 19 Aug. 1982 18 p
(NASA-Case-MFS-15791-1; US-Patent-Appl-SN-409678) Avail: NTIS HC A02/MF A01 CSCL 13I

Turbo jet engines are used to furnish the necessary high temperature, high volume medium pressure gas to provide a high vacuum test environment at comparatively low cost for space engines at sea level. Moreover, the invention provides a unique way by use of the variable area ratio ejectors with a pair of meshing cones are used. The outer cone is arranged to translate fore and aft, and the inner cone is interchangeable with other cones having varying angles of taper. NASA

N82-33713# Douglas Aircraft Co., Inc., Long Beach, Calif.
DESIGN METHODOLOGY FOR BONDED-BOLTED COMPOSITE JOINTS. VOLUME 1: ANALYSIS DERIVATIONS AND ILLUSTRATIVE SOLUTIONS Final Report, Aug. 1979 - Jun. 1981
L. J. Hart-Smith Wright-Patterson AFB, Ohio AFWAL Feb. 1982 97 p refs
(Contract F33615-79-C-3212; AF Proj. 2401)
(AD-A117342; AFWAL-TR-81-3154-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 13/5

This report contains recent developments in three aspects of joints in advanced fibrous composite structures: (1) nonlinear analysis of adhesively-bonded stepped-lap joints and doublers, (2) multirow mechanically fastened joints in aerospace structures, and (3) nonlinear analysis of combined bonded and bolted joints. The methods developed include nonlinearities needed for metal structures as well as those for composites. The analysis are based on continuum mechanics techniques and have been coded into three FORTRAN IV digital computer programs A4EI, A4EJ, and A4EK respectively. The report contains explanations of the derivations of the solutions as well as sample worked problems to illustrate both the capabilities of the programs and the behavior characteristics of the real structures. GRA

N82-33714# Albany International Corp., Dedham, Mass.
SEAMLESS COLLAPSIBLE FUEL TANKS, PHASE 1 Final Report, Apr. 1980 - Mar. 1982
N. J. Abbott and R. E. Erlandson Mar. 1982 18 p
(Contract DAAK70-80-C-0045)
(AD-A116765) Avail: NTIS HC A02/MF A01 CSCL 13/4

A tubular fabric has been woven to make two 23 x 17 foot pillow tanks. A nitrile coating which could be applied as an aqueous latex was developed. The fabric will be coated and the tanks fabricated in Phase II of this report. Author (GRA)

N82-33715# National Materials Advisory Board, Washington, D.C.
ADVANCED JOINING TECHNOLOGY Final Report
1982 103 p refs
(Contract MDA903-78-C-0038)
(AD-A117503; NMAB-387) Avail: NTIS HC A06/MF A01 CSCL 13/8

This report presents a review of the science of joining and the state of technology for joining similar and dissimilar metals to one another, ceramics to ceramics, and metals to ceramics. With respect to ceramics, mechanical joints and metallurgical bonds are considered. Important emerging technologies and advanced joining techniques are discussed, and some of the critical gaps in fundamental joining knowledge that limit progress are identified. Future research is recommended to form a basis for improved understanding of the joining process in all its many forms, and to

develop new and improved joining methods to meet future design challenges. The metal-to-metal combustions will continue to be the major joining assembly concern of the Department of Defense as it is in industry. Author (GRA)

N82-33716# Hughes Helicopters, Culver City, Calif. Research and Development Div.
DEVELOPMENT OF EFFECTIVE MACHINING AND TOOLING TECHNIQUES FOR KEVLAR COMPOSITE LAMINATES Final Report, Feb. - Dec. 1981
Rod Doerr, Ed Greene, B. Lyon, and Saad Taha Jun. 1982 56 p refs
(Contract DAAK51-81-C-0008; DA Proj. 1L2-63211-DB-41)
(AD-A117853; HHI-81-462; USAAVRADCOM-TR-82-D-4) Avail: NTIS HC A04/MF A01 CSCL 11/9

This report contains the results of the work performed for the development of the Kevlar laminate machining techniques program. The results include information assisting in the drilling, cutting and trimming of Kevlar/epoxy and Kevlar/polysulfone cured laminates. The program was in three phases. Phase 1 consisted of a technology survey and a tool vendors/developers survey. Fifty one technical documents were reviewed and eight vendors/developers were visited. Author (GRA)

N82-33717# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Hydraulics Lab.
PUMPING PERFORMANCE AND TURBIDITY GENERATION OF MODEL 600/100 PNEUMA PUMP. MAIN TEXT AND APPENDIXES A AND B Final Report, Aug. - Oct. 1978
Thomas W. Richardson, John E. Hite, Jr., Richard A. Shafer, and James D. Ethridge Apr. 1982 181 p
(AD-A117854; WES/TR/HL-82-8-App-A/B) Avail: NTIS HC A09/MF A01 CSCL 13/2

Report describes full scale tests of patented, air operated solids handling device called PNEUMA pump. Pump was tested in a river channel, lock entrance, tidal inlet, and dock area in both sand and fine grained sediment. Report describes test procedures, equipment, instrumentation, and data reduction. Results are evaluated in terms of pumping performance and turbidity generated in fine grained sediment. Pump could dredge in situ densities in fine grained sediment but could not in sand. Difficulty was experienced in sustaining high discharge densities. Power efficiencies of pump were low. No significant turbidity was measured when dredging fine grained sediment. Appendix A gives graphical presentation of performance parameters for each test run. Appendix B presents tables of measured turbidity values. Appendix C (bound separately) contains tables of measured data and calculated parameters interpolated at 9 sec intervals for each test run.
Author (GRA)

N82-33718# General Electric Co., Syracuse, N.Y. Electronics Lab.
GLASS-TO-METAL SEAL QUALITY Final Technical Report, Feb. 1981 - Feb. 1982
L. Zakraysek and H. Lin Griffiss AFB, N.Y. RADC May 1982 43 p refs
(Contract F30602-81-C-0104; AF Proj. 2338)
(AD-A117598; RADC-TR-82-93) Avail: NTIS HC A03/MF A01 CSCL 11/1

Microelectronic packages with marginal glass-to-metal seals often escape detection at receiving inspection when they are tested by present methods for determining hermeticity. A more effective test method is desirable for fulfilling the requirement of effectively detecting marginal quality microelectronic package hermeticity. This final report describes the results of an extensive study of various dye penetrant materials and specially designed equipment in developing an optimum and effective liquid dye penetrant test method for determining the hermetic quality of various types of microelectronic packages. GRA

N82-33719# Battelle Columbus Labs., Ohio.
THERMAL EFFECTS IN ROLLING/SLIDING CONTACT Final Report, 1 Jun. 1981 - 31 May 1982
T. A. Dow, R. D. Stockwell, T. L. Merriman, and J. W. Kannel 31 Jul. 1982 59 p refs
(Contract N00014-81-C-0608)
(AD-A117702; BATT-G-7818-0001) Avail: NTIS HC A04/MF A01 CSCL 11/8

This report discusses the results of a series of pressure and temperature distributions measured between a pair of elasto-hydrodynamically (EHD) lubricated disks. Three lubricants were studied: a synthetic paraffinic oil (XRM-109F), polyphenyl ether (OS-124), and a traction fluid (Santotrac 50). Pressure and temperature readings throughout the contact are presented as three dimensional plots. Measurements of the EHD film thickness, and the tractive force between disks under slip conditions are also presented. A method for one dimensional mapping of tractive force is introduced. An instrumental part of the method is the data handling capability of a digitizing oscilliscope which captures signals from the traction probe. The oscilliscope's capabilities are greatly expanded by a microprocessor which controls its functions. Preliminary results from this method of local traction measurement are presented. Author (GRA)

N82-33720# Cambridge Univ. (England). Dept. of Engineering.
LONGITUDINAL SHRINKAGE OF ECCENTRIC SINGLE-PASS WELDS
A. A. Scaramangas 1980 99 p refs
(PB82-174731; CUED/D-STRUCT/TR-85-1980; ISSN-0309-7447)
Avail: NTIS HC A05/MF A01 CSCL 13E

When a weld is laid eccentrically with respect to the longitudinal centerline of an initially stress-free plate, the magnitude of the weld shrinkage force is increased. A theory for the prediction of the size of such a force, as well as of the residual stress field across the plate is described. Existing design formulae are compared with the ones obtained using the theory and a comprehensive experimental study is carried out to supplement the theory. GRA

N82-33721# Technical Research Centre of Finland, Espoo. Metals Lab.
REAL-TIME CONTROL OF GMA WELDING
Risto Louhenpera Apr. 1981 55 p refs
(PB82-204660; ISBN-951-38-1202-2; ISSN-0355-6395; Rept-85)
Avail: NTIS HC A04/MF A01 CSCL 13J

The equipment and control of real-time control of GMA welding process is discussed. The equipment includes an inductive seam tracking system used for the torch positioning. Two versions of a real time algorithm for the control of horizontal fillet welding are presented. The algorithm allows repeatable welding of work pieces containing root gaps of 3 mm height and tack welds of 4 mm throat thickness with arbitrary length. The behavior of adaptive control during welding as well as new discrete time process models for the dependence between wire feed rate and welding current, and between arc voltage and welding current are described. The utilization of the process models and the practical application of real time control in welding are discussed. Ideal welding and control equipment to be used for adaptive welding is specified. GRA

N82-33722# Technical Research Centre of Finland, Espoo. Metals Lab.
GMA WELDING EXPERIMENTS USING REAL-TIME CONTROL
Mikko Harju Apr. 1981 49 p refs
(PB82-204652; ISBN-951-38-1201-4; ISSN-0355-6395; Rept-86)
Avail: NTIS HC A03/MF A01 CSCL 13H

Fillet welding during the development of a real time control system for gas metal arc (GMA) welding is described. The control system utilizes the arc as a sensor detecting root gaps and tack welds in the groove. The signals are handled by a microcomputer, which gives in real time acceptable welding parameters for the process. The torch position is kept constant by an inductive seam tracking system. Welding over tack welds as well as utilization of applications and further development of the control algorithm are discussed. GRA

N82-33566# California Univ., Berkeley. Dept. of Mechanical Engineering.
BAND SAW AND CIRCULAR SAW VIBRATION AND STABILITY
C. D. Mote, Jr., G. S. Schajer, and W. Z. Wu *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 14, No. 2 Feb. 1982 p 19-25 refs (For primary document see N82-33564 24-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 13/9

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-33723# Spectron Development Labs., Inc., Costa Mesa, Calif.
INVESTIGATION OF THE RAYLEIGH CRITICAL ANGLE PHENOMENON FOR THE CHARACTERIZATION OF SURFACE PROPERTIES Final Report, Mar. 1981 - Apr. 1982
B. P. Hildebrand, G. L. Fitzpatrick, and A. J. Boland 14 Apr. 1982 85 p refs
(Contract F49620-81-C-0040; AF Proj. 2306; ARPA Order 4109) (AD-A117264; AFOSR-82-0568TR; SDL-82-2188-07F) Avail: NTIS HC A05/MF A01 CSCL 14/2

An automated, computer controlled goniometer was constructed and perfected. Controlled measurements on a variety of materials, including materials of interest to the NDT community, were carried out and compared with theoretical predictions made by a number of authors. Experimental results indicate that these theories may be only first approximations to reality. A number of significant experimental anomalies, such as the appearance of more than one amplitude dip were found. Certain theoretical questions were raised regarding these theories including the question of momentum conservation at the interface. Both the experimental and theoretical observations suggest that modifications to existing theory may be necessary. Author (GRA)

N82-33724# Systems Research Labs., Inc., Dayton, Ohio. NDE Systems Div.
ADVANCED NONDESTRUCTIVE EVALUATION (ULTRASONIC PULSER/RECEIVER TECHNOLOGY) Final Report, 29 May 1979 - 1 Feb. 1981
Robert A. Shaufl Wright-Patterson AFB, Ohio AFWAL May 1982 182 p
(Contract F33615-79-C-5020; AF Proj. 2418)
(AD-A117841; AFWAL-TR-81-4038) Avail: NTIS HC A09/MF A01 CSCL 14/2

The overall goal of this program was to develop a digital ultrasonic correlation system for NDE application of greater versatility and capability than the successful analog system developed in house at AFWAL/MLLP. SRL had only limited success in meeting this overall goal. The program broke into two complementary tasks: (1) development of an all digital pulser/receiver with a bandwidth of 85 MHz and a maximum gain of 80 dB; and (2) development of a pseudo random correlation unit. The Pulser/Receiver met all of its necessary requirements; however, the correlation unit suffered from a technical design decision made early in the program as to the number of bits used in the correlation process. The decision (based upon both cost and the results of the computer model of an 8 bit correlation system) was to utilize 1 bit correlation. This choice led to an unavoidable (and most undesirable) nonlinearity in the correlated signal output when the input signal/noise ratio approached unity. This unfortunate consequences has restricted the versatility and capability of the entire system. GRA

N82-33725# State Univ. of New York, Binghamton. Dept. of Mathematical Sciences.
BAYES ADAPTIVE ESTIMATION OF THE POINT OF SHIFT TO THE WEAR-OUT PHASE OF RELIABILITY SYSTEMS
S. Zack 2 Aug. 1982 20 p refs
(Contract N00014-81-K-0407)
(AD-A117865; TR-1) Avail: NTIS HC A02/MF A01 CSCL 14/4

A new family of life distributions, called the wear-out distributions, is developed on the basis of a failure rate function, which is a constant up to the change-point and strictly increasing afterwards. Properties of these wear-out distributions are derived and a Bayes adaptive procedure is developed for the estimation of the change point. Recursive formulae are given for the determination of the posterior probability that the change has occurred and of its Bayes estimator. The results of numerical simulations are given to illustrate the properties of the adaptive procedure. Author (GRA)

N82-33726# Korea Advanced Energy Research Inst., Seoul.
DEVELOPMENT OF NONDESTRUCTIVE TESTING TECHNIQUE. ULTRASONIC TESTING AND RADIOGRAPHIC TESTING
Y. P. Lee, K. K. Ryoo, H. S. Ahn, Y. M. Chung, and S. C. Kang 1980 216 p refs In KOREAN; ENGLISH summary
(DE82-700448; KAERI/RR-262/80) Avail: NTIS (US Sales Only) HC A10/MF A01; DOE Depository Libraries

The feasibility of determining defect size by ultrasonic testing with artificial reference block and maximum echo was investigated. The design and fabrication of the various necessary calibration blocks used were carried out according to existing ASME code and standard. A container for Co-60, 10 Ci was designed to apply the radioisotope for radiographic testing. Neutron radiographic testing using thermal neutron flux (1.7 x 10 to the 6th - 7th power N sq cm/sec) produced from the reactor (250 KW) was attempted and compared with X-ray radiographic testing. The thickness of boiler tubes for a paper mill was successfully measured. DOE

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N82-33727# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 10 Monthly Report
Judith Nagle-Eshleman, ed. Dec. 1980 117 p refs
(AD-A106486) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Recent progress in the dynamic plastic behavior of structure is reviewed. Plate vibration research between 1976 and 1980 is summarized. For individual titles, see N82-33728 through N82-33729.

N82-33728# Liverpool Univ. (England). Dept. of Mechanical Engineering.
RECENT PROGRESS IN THE DYNAMIC PLASTIC BEHAVIOR OF STRUCTURES, PART 3
N. Jones *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 13, No. 10 Dec. 1980 p 3-16 refs (For primary document see N82-33727 24-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

The literature on the dynamic plastic response of structures published since 1978 is surveyed. The review focuses on the behavior of such simple structural components as beams, plates, and shells subjected to large dynamic loads that cause extensive plastic flow of the material. Author

N82-33729# Ohio State Univ., Columbus.
PLATE VIBRATION RESEARCH, 1976-1980: COMPLICATING EFFECTS
A. Leissa *In* Shock and Vibration Inform. Center The Shock and

Vibration Digest, Vol. 13, No. 10 Dec. 1980 p 19-36 refs (For primary document see N82-33727 24-39)
(Contract N00014-80-K-0281)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Research in free, transverse vibrations of plates is summarized. Complicating effects such as anisotropy, inplane force, variable thickness, surrounding media (e.g., air or water), large (nonlinear) transverse displacements, shear deformation, rotary inertia and nonhomogeneity are considered. Author

N82-33730# Technion - Israel Inst. of Tech., Haifa.
VIBRATIONS OF AXIALLY LOADED STIFFENED CYLINDRICAL PANELS WITH ELASTIC RESTRAINTS
J. Singer, O. Rand, and A. Rosen Jul. 1981 54 p refs Sponsored in part by DFG and RWTH
(TAE-439) Avail: NTIS HC A04/MF A01

The vibrations and buckling of preloaded stiffened cylindrical panels with different boundary conditions, including elastic restraints are analyzed. The analysis uses linear, smeared stiffener, Flugge type theory. A computer program VIPAL was developed and its details are presented. S.L.

N82-33731# Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
FURTHER INITIAL IMPERFECTION MEASUREMENTS OF INTEGRALLY STRINGER STIFFENED CYLINDRICAL SHELL, SERIES 2
R. Yaffe, J. Singer, and H. Abramovich Jul. 1981 41 p refs
(TAE-404) Avail: NTIS HC A03/MF A01

The initial geometric imperfections of 10 inch diameter integrally stringer stiffened cylindrical shells were measured in a special scanning system. The system consists essentially of a probe, traveling along a helical path inside the shell, whose output is recorded digitally on a minicomputer. The imperfection measurements of 6 shells, employed in different test programs, are presented both in graphical form and as coefficients of Fourier series, a standard representation for imperfection data. Author

N82-33732# Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
THE FATIGUE NOTCH FACTOR REVISITED
Avraham Berkovits Apr. 1981 42 p refs
(TAE-446) Avail: NTIS HC A03/MF A01

In applying the Neuber approach in the analysis of notched structures under fatigue loading, use is made of K sub f, the fatigue notch factor, sometimes called the fatigue strength reduction factor. However, use of K sub f is subject to a number of limitations which today severely curtail the successful application of the Neuber method. Clearly K sub f is a function of the theoretical stress concentration factor K sub t. It may also depend on fatigue lifetime N, strss ratio R, and temperature T. Fatigue data were reexamined in order to determine K sub f as K sub f = K sub f (material, K sub t, R, N, T) for a range of materials. Materials examined included aluminum, steel, titanium and nickel alloys. Results are presented in the form of K sub f and notch sensitivity factor q over a wide range of notch and S.L.

N82-33733*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESULTS FROM TESTS OF THREE PROTOTYPE GENERAL AVIATION SEATS
M. Susan Williams and Edwin L. Fasanella (Kentron International, Inc., Hampton, Va.) Aug. 1982 53 p refs
(NASA-TM-84533; NAS 1.15:84533) Avail: NTIS HC A04/MF A01 CSCL 20K

Three types of energy absorbing general aviation seats were dynamically tested and evaluated for crash load attenuation. On the basis of the static and dynamic test results, it was recommended that the tubular frame seats be redesigned to initiate stroking at approximately 12 G's rather than the 20 to 25 G range. Lower density foam was recommended for the foam wedge passenger seat. A.R.H.

N82-33734# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
HELICOPTER VIBRATION SUPPRESSION USING SIMPLE PENDULUM ABSORBERS ON THE ROTOR BLADE Final Report
G. Alvin Pierce and M-Nabil H. Hamouda Washington NASA Aug. 1982 140 p refs Sponsored in part by Army
(Grant NsG-1592)
(NASA-CR-3619; NAS 1.26:3619) Avail: NTIS HC A07/MF A01 CSCL 20K

Simple pendulums are installed on the blades of a helicopter rotor to suppress the root reactions. A frequency response analysis is conducted of typical rotor blades excited by a harmonic variation of spanwise airload distributions as well as a concentrated load at the tip. The effect of pendulum tuning on the minimization of the hub reactions is considered. A properly designed flapping pendulum attenuates the root out of plane force and moment whereas the optimum designed lead lag pendulum attenuates the root in plane reactions. A properly tuned pendulum can attenuate the vibratory loads by generating appropriate forces at its attachment point with the blade. These forces redistribute the loads on the blade so that only a small portion of the reactions is transmitted to the hub. For optimum pendulum tuning the parameters to be determined are the pendulum uncoupled natural frequency, the pendulum spanwise location and its mass. It is found that the optimum pendulum frequency is in the vicinity of the excitation frequency. A pendulum can be tuned and its optimum mass determined by excitation with a concentrated simple harmonic load at the tip. However, it is necessary to utilize distributed airloads to accurately determine the attenuation of the root reactions. S.L.

N82-33735*# Textron Bell Helicopter, Fort Worth, Tex.
CRASHWORTHY AIRFRAME DESIGN CONCEPTS: FABRICATION AND TESTING Final Report, Apr. 1977 - May 1982
James D. Cronkhite and V. L. Berry Sep. 1982 206 p refs
(Contract NAS1-14890)
(NASA-CR-3603; NAS 1.26:3603) Avail: NTIS HC A10/MF A01 CSCL 20K

Crashworthy floor concepts applicable to general aviation aircraft metal airframe structures were investigated. Initially several energy absorbing lower fuselage structure concepts were evaluated. Full scale floor sections representative of a twin engine, general aviation airplane lower fuselage structure were designed and fabricated. The floors featured an upper high strength platform with an energy absorbing, crushable structure underneath. Eighteen floors were fabricated that incorporated five different crushable subfloor concepts. The floors were then evaluated through static and dynamic testing. Computer programs NASTRAN and KRASH were used for the static and dynamic analysis of the floor section designs. Two twin engine airplane fuselages were modified to incorporate the most promising crashworthy floor sections for test evaluation. S.L.

N82-33736*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MEASURED AND CALCULATED EFFECTS OF ANGLE OF ATTACK ON THE TRANSONIC FLUTTER OF A SUPERCRITICAL WING
E. Carson Yates, Jr., Eleanor C. Wynne, and Moses G. Farmer Aug. 1982 30 p refs
(NASA-TM-83276; NAS 1.15:83276) Avail: NTIS HC A03/MF A01 CSCL 20K

For abstract see A82-30143.

N82-33737*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
IMPROVED DAMAGE TOLERANCE OF TITANIUM BY ADHESIVE LAMINATION
W. S. Johnson Jul. 1982 35 p refs Presented at the 23rd AIAA/ASME/ASCE/AHS Struct., Structural Dyn., and Mater. Conf., New Orleans, 10-12 May 1982 Submitted for publication
(NASA-TM-84525; NAS 1.15:84525) Avail: NTIS HC A03/MF A01 CSCL 20K

Basic damage tolerance properties of Ti-6Al-4V titanium plate can be improved by laminating thin sheets of titanium with adhesives. Compact tension and center cracked tension specimens made from thick plate, thin sheet, and laminated plate (six plies of thin sheet) were tested. The fracture toughness of the laminated plate was 39 percent higher than the monolithic plate. The laminated plate's through the thickness crack growth rate was about 20 percent less than that of the monolithic plate. The damage tolerance life of the surface cracked laminate was 6 to over 15 times the life of a monolithic specimen. A simple method of predicting crack growth in a crack ply of a laminate is presented. S.L.

N82-33738*# Dayton Univ., Ohio. Dept. of Aerospace Mechanics.

A PRELIMINARY STUDY OF CRACK INITIATION AND GROWTH AT STRESS CONCENTRATION SITES Interim Technical Report, 1 Jan. - 31 Aug. 1982

D. S. Dawicke, J. P. Gallagher, G. A. Hartman, and A. M. Rajendran Sep. 1982 30 p refs
(Grant NAG3-246)
(NASA-CR-169358; NAS 1.26:169358; UDR-TR-82-119; ITR-1)
Avail: NTIS HC A03/MF A01 CSCL 20K

Crack initiation and propagation models for notches are examined. The Dowling crack initiation model and the E1 Haddad et al. crack propagation model were chosen for additional study. Existing data was used to make a preliminary evaluation of the crack propagation model. The results indicate that for the crack sizes in the test, the elastic parameter K gave good correlation for the crack growth rate data. Additional testing, directed specifically toward the problem of small cracks initiating and propagating from notches is necessary to make a full evaluation of these initiation and propagation models. S.L.

N82-33739*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

RESEARCH IN STRUCTURAL AND SOLID MECHANICS, 1982 Research-in-Progress Reports

Jerrold M. Housner, comp. and Ahmed K. Noor, comp. (George Washington Univ., Washington, D.C.) Oct. 1982 427 p refs Proc. of Symp. on Advan. and Trends in Struct. and Solid Mech., Washington, D.C., 4-7 Oct. 1982; sponsored in cooperation with NSF, AFOSR, ONR, American Society of Civil Engineers and American Society of Mechanical Engineers
(NASA-CP-2245; L-15506; NAS 1.55:2245) Avail: NTIS HC A19/MF A01 CSCL 20K

Advances in structural and solid mechanics, including solution procedures and the physical investigation of structural responses are discussed. For individual titles, see N82-33740 through N82-33765.

N82-33740*# Lockheed Missiles and Space Co., Palo Alto, Calif. Applied Mechanics Lab.

A SEMI-IMPLICIT DYNAMIC RELAXATION ALGORITHM FOR STATIC NONLINEAR STRUCTURAL ANALYSIS

K. C. Park and C. C. Rankin *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 1-10 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

A semiimplicit dynamic relaxation technique for solution of the nonlinear structural equilibrium equation is presented. A previously presented basic transient response analysis algorithm is employed, permitting use of one solution method and one software module for both static and dynamic analyses. A theoretical comparison of the method with explicit dynamic relaxation techniques shows that it offers a substantially improved convergence property without additional computational overhead. J.D.

N82-33741*# Virginia Polytechnic Inst. and State Univ., Blacksburg.

MINIMIZATION VERSUS HOMOTOPY ALGORITHMS

M. P. Kamat, L. T. Watson, and V. B. Venkayya (AFFDL) *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 11-24 refs (For primary document see N82-33739 24-39)
(Grant NAG1-139)
Avail: NTIS HC A19/MF A01 CSCL 20K

The relative merits and demerits of the minimization techniques are assessed using globally convergent quasi-Newton algorithms on the one hand and the homotopy algorithms on the other hand for the solution of problems of nonlinear structural analysis. Like the homotopy algorithms, the globally convergent quasi-Newton algorithms are equally suited for the solution of the nonlinear equations of structural analysis directly without having to pose the problem as an equivalent minimization problem. In the close neighborhood of the limit and bifurcation points quasi-Newton algorithms experience difficulties. Homotopy algorithms are robust for practically all types of nonlinear problems but are computationally not as cost effective since they provide an extremely accurate prediction of the response by calculating it as a large number of points. Globally convergent algorithms can perform well with very approximate Hessians, while homotopy algorithms require extremely accurate Hessians. While quasi-Newton algorithms can be very easily structured to exploit sparsity and symmetry, homotopy algorithms are not presently so structured and would require special modifications for exploitation of such features without sacrificing robustness and global convergence. Author

N82-33742*# California Univ., Berkeley. Div. of Structural Engineering and Structural Mechanics.

OPERATOR SPLIT METHODS IN THE NUMERICAL SOLUTION OF THE FINITE DEFORMATION ELASTOPLASTIC DYNAMIC PROBLEM

Peter M. Pinsky, Miguel Ortiz, and Robert L. Taylor *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 25-47 refs Sponsored by Lawrence Livermore Lab. and General Motors Research Labs. (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

The spatial formulation of the elastoplastic dynamic problem for finite deformations is considered. A thermodynamic argument leads to an additive decomposition of the spatial rate of deformation tensor and allows an operator split of the evolutionary equations of the problem into elastic and plastic parts. This operator split is taken as the basis for the definition of a global product algorithm. In the context of finite element discretization the product algorithm entails, for every time step, the solution of a nonlinear elastodynamic problem followed by the application of plastic algorithms that operate on the stresses and internal variables at the integration points and bring in the plastic constitutive equations. Suitable plastic algorithms are discussed for the cases of perfect and hardening plasticity and viscoplasticity. The proposed formalism does not depend on any notion of smoothness of the yield surface and is applicable to arbitrary convex elastic regions, with or without corners. The stability properties of the global product algorithm are shown to be identical to those of the algorithm used for the integration of the nonlinear elastodynamic problem. Numerical examples illustrate the accuracy of the method. Author

N82-33743*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

APPLICATION OF THE REDUCED BASIS METHOD TO NONLINEAR TRANSIENT THERMAL ANALYSIS

Charles P. Shore *In its* Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 49-65 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

An effort to apply the reduced basis method to nonlinear transient thermal analysis is described. The method combines the classical Rayleigh-Ritz and modal superposition techniques with contemporary finite element methods to retain modeling versatility as the degrees of freedom in a problem are reduced. The essence of the method is to use a few thermal modes from eigenvalue analyses as basis vectors to represent the temperature response for a given thermal problem similar to the use of vibration modes to represent displacements in a dynamic response problem.

Approximate temperature distributions were obtained using the reduced basis method for a small section of the Shuttle Orbiter lower wing undergoing reentry heating. Good agreement was obtained between the reduced basis method solutions and full system solutions with reductions in the degrees of freedom of up to a factor of four. The good agreement indicates the reduced basis method has the potential for significant reduction in computing effort for thermal analysis; however, considerable work remains to determine techniques for selecting the type and number of basis vectors needed for approximate solutions to more complex transient thermal problems. Author

N82-33744*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NONLINEAR CONSTITUTIVE THEORY FOR TURBINE ENGINE STRUCTURAL ANALYSIS
Robert L. Thompson *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 67-96 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

A number of viscoplastic constitutive theories and a conventional constitutive theory are evaluated and compared in their ability to predict nonlinear stress-strain behavior in gas turbine engine components at elevated temperatures. Specific application of these theories is directed towards the structural analysis of combustor liners undergoing transient, cyclic, thermomechanical load histories. The combustor liner material considered in this study is Hastelloy X. The material constants for each of the theories (as a function of temperature) are obtained from existing, published experimental data. The viscoplastic theories and a conventional theory are incorporated into a general purpose, nonlinear, finite element computer program. Several numerical examples of combustor liner structural analysis using these theories are given to demonstrate their capabilities. Based on the numerical stress-strain results, the theories are evaluated and compared. Author

N82-33745*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PREDICTION OF RESIDUAL TENSILE STRENGTH OF TRANSVERSELY IMPACTED COMPOSITE LAMINATES
K. M. Lal (Old Dominion Univ.) *In its* Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 97-111 refs (For primary document see N82-33739 24-39)
(Grant NAG1-196)
Avail: NTIS HC A19/MF A01 CSCL 20K

The response to low velocity impact of graphite-epoxy T300/5208 composite laminates is discussed. Steel balls of 3/8 inch, 5/8 inch, and 1 inch diameter were the projectiles. Impact energy was limited to 1.2 joules. Impacted specimens were ultrasonically C scanned to determine the impact damaged region. The threshold value of impact energy for impact damage was found to be approximately 0.3 joules. A model was developed to predict the tensile residual strength of impact damaged specimens from fracture mechanics concepts. Impacted specimens were tested in tension to provide a fracture data base. The experimental results agreed well with the predictions from fracture mechanics. In this study, the maximum impact velocity used to simulate the low velocity transverse impact from common objects like tool drops was 10 m/s. Author

N82-33746*# Cagliari Univ. (Italy). Ist. Scienza Costruzioni.
INTERACTION OF HEAT PRODUCTION, STRAIN RATE AND STRESS POWER IN A PLASTICALLY DEFORMING BODY UNDER TENSILE TEST
A. Paglietti *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 113-127 refs Sponsored by CNR and MPI (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

At high strain rates the heat produced by plastic deformation can give rise to a rate dependent response even if the material has rate independent constitutive equations. This effect has to be evaluated when interpreting a material test, or else it could erroneously be ascribed to viscosity. A general thermodynamic theory of tensile testing of elastic-plastic materials is given in this paper; it is valid for large strain at finite strain rates. It enables discovery of the parameters governing the thermodynamic strain rate effect, provides a method for proper interpretation of the results of the tests of dynamic plasticity, and suggests a way of planning experiments in order to detect the real contribution of viscosity. Author

N82-33747*# Ecole Nationale Superieure de l'Aeronautique et de l'Espace, Toulouse (France).
APPLICATION OF A BOUNDARY ELEMENT METHOD TO THE STUDY OF DYNAMICAL TORSION OF BEAMS
Casimir Czekajski, Serge Laroze, and Daniel Gay (Inst. National des Sciences Appliquees, Toulouse) *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 129-139 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

During dynamic torsion of beam elements, consideration of nonuniform warping effects involves a more general technical formulation then that of Saint-Venant. Nonclassical torsion constants appear in addition to the well known torsional rigidity. The adaptation of the boundary integral element method to the calculation of these constants for general section shapes is described. The suitability of the formulation is investigated with some examples of thick as well as thin walled cross sections. Author

N82-33748*# General Electric Co., Schenectady, N. Y.
A NOVEL BOUNDARY ELEMENT METHOD PROGRAM FOR HEAT TRANSFER ANALYSIS OF COMPOSITE MATERIALS
Kamar J. Singh *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 141-152 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

A boundary element method computer program developed for heat transfer analysis of two dimensional composite structures is described. The program runs on a time share mode and interacts with the user for multirun analysis. During a run, the geometry can be modified interactively by the user as many times as desired by using various options available and the new results printed or plotted. A concept of plotting the results for boundary element method is introduced. The advantage of such a program over the finite element method for simple design problems is demonstrated. Author

N82-33749*# Washington Univ., St. Louis, Mo. School of Engineering and Applied Science.
IMPLEMENTATION OF A C-1 TRIANGULAR ELEMENT BASED ON THE P-VERSION OF THE FINITE ELEMENT METHOD
D. W. Wang, I. N. Katz, and B. A. Szabo *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 153-170 refs (For primary document see N82-33739 24-39)
(Grant AF-AFOSR-0252-81)
Avail: NTIS HC A19/MF A01 CSCL 20K

The implementation of a computer code CONE (for C(1) continuity) based on the p-version of the finite element method is described. A hierarchic family of triangular finite elements of degree $p > 5$ is used. This family enforces C(1)-continuity across interelement boundaries, and the code is applicable to fourth order partial differential equations in two independent variables, in particular to the biharmonic equation. Applications to several benchmark problems in plate bending are presented. Sample results are examined and compared with theoretical predictions. In particular the analysis of the bending of a rhombic plate shows a significant improvement over othr published results. Author

N82-33750*# Case Inst. of Tech., Cleveland, Ohio. Dept. of Civil Engineering.
INTEGRATION OF MULTIDIMENSIONAL REGIONS WITH APPLICATIONS TO FINITE ELEMENT ANALYSIS
Robert L. Mullen *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 171-183 refs (For

primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

Alternatives to Gaussian integration methods for multidimensional regions are presented. These rules preserve the convergence behavior of the exact integrated element but require fewer evaluation points than the Gauss methods. Numerical examples are given to verify the behavior of the new integration rules.
Author

N82-33751*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AN EMULATOR FOR MINIMIZING FINITE ELEMENT ANALYSIS IMPLEMENTATION RESOURCES
Robert J. Melosh, Senol Utku, Moktar Salama, and Munir Islam (NuTech Corp.) *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 185-199 refs Prepared in cooperation with Duke Univ., Durham, N.C. (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

A finite element analysis emulator providing a basis for efficiently establishing an optimum computer implementation strategy when many calculations are involved is described. The SCOPE emulator determines computer resources required as a function of the structural model, structural load-deflection equation characteristics, the storage allocation plan, and computer hardware capabilities. Thereby, it provides data for trading analysis implementation options to arrive at a best strategy. The models contained in SCOPE lead to micro-operation computer counts of each finite element operation as well as overall computer resource cost estimates. Application of SCOPE to the Memphis-Arkansas bridge analysis provides measures of the accuracy of resource assessments. Data indicate that predictions are within 17.3 percent for calculation times and within 3.2 percent for peripheral storage resources for the ELAS code.
Author

N82-33752*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE FINITE ELEMENT MACHINE: AN EXPERIMENT IN PARALLEL PROCESSING
O. O. Storaasli, S. W. Peebles, T. W. Crockett (Kentron Technical Center), J. D. Knott (Kentron Technical Center), and L. Adams (Virginia Univ., Charlottesville) *In its* Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 201-217 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

The Finite Element Machine at the NASA Langley Research Center is a prototype computer designed to support parallel solutions to structural analysis problems. The hardware architecture and support software for the machine, initial solution algorithms and test applications, and preliminary results are described. Directions for future work are presented.
Author

N82-33753*# Maryland Univ., College Park. Dept. of Aerospace Engineering.
A MIXED FORMULATION FINITE ELEMENT FOR LINEAR THIN SHELL ANALYSIS
S. W. Lee and S. C. Wong *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 219-228 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

An eight node curved thin shell element was tested. The element is based on the degenerate solid concept and the mixed formulation with the independent inplane and transverse shear strains. The number of unknown parameters in the assumed strains is chosen to alleviate the spurious constaining or locking effect. It is indicated that for a pinched cylindrical shell with diaphragmed ends and fixed ends the present element shows good performance.
EAK

N82-33754*# Virginia Univ., Charlottesville.
AN EXACT ZOOMING METHOD FOR FINITE ELEMENT ANALYSES
Itio Hirai (Kumamoto Univ., Japan), Bo Ping Wang, and Walter D. Pilkey *In* NASA. Langley Research Center Res. in Struct. Solid Mech., 1982 Oct. 1982 p 229-249 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

An exact zooming technique which employs static condensation and exact structural reanalysis methods was developed. Successive application of static condensation reduces the system to one that is only associated with the degrees of freedom (dof) of the original model. Application of an exact static reanalysis technique permits the displacements at the dof of the original model that are contained in the zoomed portion of the structure to be obtained first. The response external to the zoom, as well as the response of additional dof within various levels of zooming, is computed. With the triangular factor of the stiffness matrix of the original system available, this approach involves only the solution of a system of equations of small order.
E.A.K.

N82-33755*# New York Univ., Buffalo. Dept. of Civil Engineering.
DYNAMIC RESPONSE OF LINED TUNNELS BY BOUNDARY ELEMENTS
G. D. Manolis *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 251-264 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

The dynamic stress concentration manifested around a lined cylindrical tunnel buried in an infinitely extending linear elastic or viscoelastic medium due to the passage of transient disturbances was investigated. Plane strain is assumed to hold and the transient disturbances can be of any arbitrary time variation. The boundary element method formulated in the Laplace transform domain is employed. Isoparametric boundary elements are used in the discretization of the liner and tunnel surfaces. Viscoelastic material behavior can be readily obtained from the linear elastic case in the Laplace transform domain through the use of the correspondence principle. The transient solution is recovered by numerical inversion of the solution obtained in the transformed domain.
E.A.K.

N82-33756*# Houston Univ., Tex. Dept. of Civil Engineering.
A FINITE ELEMENT APPROACH FOR SHELLS OF REVOLUTION WITH A LOCAL DEVIATION
Kye J. Han and Phillip L. Gould (Washington Univ.) *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 265-283 refs (For primary document see N82-33739 24-39)
(Grant NSF CEE-81-11797)
Avail: NTIS HC A19/MF A01 CSCL 20K

A finite element model that is suitable for the static analysis of shells of revolution with arbitrary local deviations is presented. The model employs three types of elements: rotational, general, and transitional shell elements. The rotational shell elements are used in the region where the shell is axisymmetric. The general shell element are used in the local region of the deviation. The transitional shell elements connect these two distinctively different types of elements and make it possible to combine them in a single analysis. The form of the global stiffness matrix resulting when different forms of nodal degrees of freedom are combined is illustrated. The coupling of harmonic degrees of freedom due to the locally nonaxisymmetric geometry was studied. The use of a substructuring technique and separate partial harmonic analysis is recommended.
E.A.K.

N82-33757*# Waterloo Univ. (Ontario). Dept. of Solid Mechanics.
SYNTHESIS OF FRAMEWORKS UNDER MULTILEVEL PERFORMANCE CONSTRAINTS
Donald E. Grierson and Thomas C. W. Chiu *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 285-299 refs Sponsored in part by the National Sciences and Engineering Research Council of Canada (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

A method for the minimum weight design of practical planar frameworks under both service and ultimate loading conditions is presented. Acceptable elastic stresses and displacements are ensured at the service load level while, simultaneously, adequate safety against plastic collapse is ensured at the ultimate load level. The features of the design method for an industrial steel mill building are illustrated. E.A.K.

N82-33758*# Auburn Univ., Ala. Engineering Experiment Station.

A SIMULATION LANGUAGE APPROACH TO STRUCTURAL INTERACTION PROBLEMS

Malcolm A. Cutchins and James W. Purvis (Sandia Labs., Albuquerque) *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 301-312 refs (For primary document see N82-33739 24-39)

(Contract F08635-78-C-0027)

Avail: NTIS HC A19/MF A01 CSCL 20K

Advantages and disadvantages of using simulation languages in solving structural problems are given. Structural and solid mechanics problems which have strong interactions with other disciplines are emphasized. An aeroservoelastic illustration is described with significant interactions between the dynamics of a flexible flight vehicle structure, the aerodynamics to which it is subjected, the dynamic flight equations, and the vehicle's servo-control system. E.A.K.

N82-33759*# Concordia Univ., Montreal (Quebec). Dept. of Civil Engineering.

SUSCEPTIBILITY OF SYMMETRIC STRUCTURES TO NONLINEAR TORSIONAL COUPLING

O. A. Pekau and Pradip K. Syamal *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 313-328 refs (For primary document see N82-33739 24-39)

Avail: NTIS HC A19/MF A01 CSCL 20K

The susceptibility to induced torsional response of symmetric building structures with nonlinear resisting elements was investigated. Stability curves show the effect of the arrangement of the load resisting elements on induced torsional coupling in these nonliner but other wise symmetric structures. Universal upper and lower bound instability curves are also derived; these identify the susceptibility to torsional coupling of symmetric structures with different stiffness arrangements but which have equal mass and total lateral stiffness, and which are intended to model alternative structural strategies for lateral load resistance. E.A.K.

N82-33760*# Ohio State Univ., Columbus. Dept. of Engineering Mechanics.

ADVANCES AND TRENDS IN PLATE BUCKLING RESEARCH

Arthur Leissa *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 329-348 refs (For primary document see N82-33739 24-39)

(Contract N00014-80-K-0281)

Avail: NTIS HC A19/MF A01 CSCL 20K

Advances and current trends in plate bucklin research are summarized. The field is divided into three parts: (1) classical buckling studies, including plates of rectangular, circular and other shapes; (2) classical complicating effects, including elastic foundation, anisotropic material, variable thickness, shear deformation and nonhomogeneous material; and (3) nonclassical considerations, including postbuckling, imperfections, parametric excitation, follower forces, magnetoelastic buckling and inelastic buckling. E.A.K.

N82-33761*# Saskatchewan Univ., Saskatoon. Transportation Centre.

SOLUTION OF VON KARMAN'S PLATE EQUATION WITH PERTURBATION AND SERIES SUMMATION

L. Glen Watson and Joseph M. Chudobiak *In* NASA. Langley Research Centre Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 349-361 refs (For primary document see N82-33739 24-39)

Avail: NTIS HC A19/MF A01 CSCL 20K

A nonlinear series summation technique was combined with Chien's small parameter perturbation technique to solve the problem of the finite deflection of a simply supported circular plate subjected to a uniform transverse load. Problems involving finite deflections of plates with simply supported or free edges were regarded as almost intractable. The great advantage of incorporating the summation method into the solution procedure is demonstrated. E.A.K.

N82-33762*# Cincinnati Univ., Ohio.

CONSTRAINED MULTIBODY SYSTEM DYNAMICS: AN AUTOMATED APPROACH

James W. Kamman and Ronald L. Huston *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 363-373 refs (For primary document see N82-33739 24-39)

(Contract N00014-76-C-0139)

Avail: NTIS HC A19/MF A01 CSCL 20K

The governing equations for constrained multibody systems are formulated in a manner suitable for their automated, numerical development and solution. The closed loop problem of multibody chain systems is addressed. The governing equations are developed by modifying dynamical equations obtained from Lagrange's form of d'Alembert's principle. The modifications is based upon a solution of the constraint equations obtained through a zero eigenvalues theorem, is a contraction of the dynamical equations. For a system with n-generalized coordinates and m-constraint equations, the coefficients in the constraint equations may be viewed as constraint vectors in n-dimensional space. In this setting the system itself is free to move in the n-m directions which are orthogonal to the constraint vectors. E.A.K.

N82-33763*# North Carolina State Univ., Raleigh.

SYSTEM IDENTIFICATION: A QUESTION OF UNIQUENESS, REVISITED

Joseph E. Hardee and Vernon C. Matzen *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 375-389 refs (For primary document see N82-33739 24-39)

(Grant NSF PFR-80-07389)

Avail: NTIS HC A19/MF A01 CSCL 20K

Questions of uniqueness of parameters which were obtained from a system identification algorithm were investigated. The local properties of the surface defined by the error function were used. Static and dynamic numerical experiments on determinate and indeterminate trusses and on shear buildings illustrate the procedure. Examples are given of loading and sensor configurations which produce unique parameters E.A.K.

N82-33764*# State Univ. of New York, Buffalo. Dept. of Mechanical and Aerospace Engineering.

A COMPUTER PACKAGE FOR THE DESIGN AND EIGENPROBLEM SOLUTION OF DAMPED LINEAR MULTIDEGREE OF FREEDOM SYSTEMS

Mehdi Ahmadian and Daniel J. Inman *In* NASA. Langley Research Center Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 391-403 refs (For primary document see N82-33739 24-39)

(Grant NSF MEA-81-12826)

Avail: NTIS HC A19/MF A01 CSCL 20K

Systems described by the matrix differental equation are considered. An interactive design routine is presented for positive definite mass, damping, and stiffness matrices. Designing is accomplished by adjusting the mass, damping, and stiffness matrices to obtain a desired oscillation behavior. The algorithm also features interactively modifying the physical structure of the system, obtaining the matrix structure and a number of other system properties. In case of a general system, where the [M], [C], and [K] matrices lack any spcial properties, a routine for the eigenproblem solution of the system is developed. The latent roots are obtained by computing the characteristic polynomial of the system and solving for its roots. The above routines are prepared in FORTRAN IV and prove to be usable for the machines with low core memory. E.A.K.

N82-33765*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EXTENSIONAL COLLAPSE MODES OF STRUCTURAL MEMBERS
Robert J. Hayduk and Tomasz Wierzbicki (MIT) *In its* Res. in Struct. and Solid Mech., 1982 Oct. 1982 p 405-434 refs (For primary document see N82-33739 24-39)
Avail: NTIS HC A19/MF A01 CSCL 20K

Attenuation of the load transmitted to a vehicle occupant by the structure, either by modifying structural assembly, changing geometry of its elements, or adding specific load limiting devices to help dissipate kinetic energy was studied. General aviation aircraft have fuselage subfloors of a built up structure which are generally very stiff perpendicular to the floor of the cabin. The subfloor structure, designed to crush at an appropriate force level, can be used to advantage in a crash by dissipating energy through plastic buckling of the floor beams and frames. Simple closed form solutions to predict the mean crushing force levels of subfloor designs is useful in engineering practice. The crushing process of thin walled, plate formed, open structures with particular emphasis on L and cruciform shapes was analyzed. Lower and upper bound solutions for the mean crushing strength of cruciforms are obtained by considering modes of deformation which account for both bending and extensional deformation. It is the importance of extensional deformation to the energy absorption process, representing at least one third of the dissipated energy is shown. E.A.K.

N82-33766# Naval Ship Research and Development Center, Bethesda, Md.
THE DEVELOPMENT OF A THERMAL DISTORTION CODE USING THE FINITE ELEMENT METHOD Final Report
James A. Ma Jun. 1982 32 p refs
(ZR0000101)
(AD-A116868; DTNSRDC-82/050) Avail: NTIS HC A03/MF A01 CSCL 20/13

A finite element code to account for thermal expansion in a solid was developed for the Independent Research and Independent Exploratory Development project 'Tribology of Sliding Surface Bearings.' The program is based on a two-dimensional model using a second, or higher order interpolation function in the element space that will allow a diverse temperature field, such as a steep, nonlinear temperature gradient, to be prescribed in a solid body. The computer code has a definite advantage over certain finite element systems, commercially available. Many accept only a constant, or averaged temperature input into their element space. With the new capabilities, complex thermal mechanical responses under severe temperature gradients can be readily analyzed. For instance, the hot spot in a ship's landing deck due to the concentrated heat load, such as those generated by high temperature jet exhaust, can be more realistically represented by the elements of current development. The element mesh size and the input data set are more manageable. Author (GRA)

N82-33767# Naval Ocean Systems Center, San Diego, Calif. Weapons Technology Div.
APPROXIMATE THEORY FOR THE TRANSVERSE MOTION OF A TWO-LAYERED PLATE. A THEORETICAL MODEL APPLICABLE TO ACOUSTIC SCATTERING FROM SUBMERGED STRUCTURES WITH COATING LAYER(S) Technical Progress Report, Dec. 1981 - Mar. 1982
B. Q. Vu 3 Mar. 1982 37 p refs
(SF33326602)
(AD-A117034; NOSC/TR-774) Avail: NTIS HC A03/MF A01 CSCL 20/1

An approximate theory is developed for the transverse motion of a two-layered plate. The two layers are assumed to be elastic, isotropic, homogeneous, and welded to each other. The theory is similar to the Timoshenko-Mindlin model for a single-layered plate in which corrections are included for shear and rotary inerita. A single equation of transverse motion is derived that predicts the first four antisymmetric modes and is applicable to practical problems. Phase velocities of these modes are numerically analyzed for a plate consisting of a copper layer and a steel layer. Author (GRA)

N82-33768# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
DURABILITY OF REINFORCED CONCRETE BEAMS EXPOSED TO MARINE ENVIRONMENT Final Report
Edward F. ONeil Apr. 1982 23 p refs
(AD-A117284; WES/MP/SL-82-1) Avail: NTIS HC A02/MF A01 CSCL 13/13

A study was begun in 1950 to determine the effects of severe natural weathering on stressed, reinforced concrete beams of various compositions and degrees of stress. The objectives of the study were to obtain information on the long-term weathering of air-entrained and nonair-entrained concrete beams containing steel of different compositions and types of deformation and having different levels of stress in the steel that would cause varying degrees of cracking of the concrete. Author (GRA)

N82-33769# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
DURABILITY OF POST-TENSIONED CONCRETE BEAMS EXPOSED TO SEVERE NATURAL WEATHERING Final Report
Edward F. ONeil Apr. 1982 19 p
(AD-A13130; WES/MP/SL-82-2) Avail: NTIS HC A02/MF A01 CSCL 13/13

A study of the durability of post-tensioned concrete beams and of the types of end caps used to protect the anchorage systems from deterioration when subjected to severe environmental conditions was conducted. Twenty post-tensioned concrete beams 254 by 406 mm (10 by 16 in.) in cross section and 2.44 m (8 ft) in length were cast, post-tensioned, and placed at the mean tide elevation on the beach at Treat Island off the coast of Eastport, Maine. The beams were subjected to twice daily wetting and drying cycles plus an average of 130 freezing and thawing cycles per winter for a period of 12 to 13 years. During this exposure period, the beams were inspected annually to determine the condition of each end cap or plug, the joint between beam and cap or plug, and the beams themselves. At the end of the exposure period, eight representative beams were returned to the laboratory for autopsy and analysis of the protective caps, the method of joint preparation, and the post-tensioning steel being protected. The results of the durability investigation indicated, among other findings, that the end protective caps attached to the beams by reinforcing bars across the cap/beam joint experienced no cap failures; the epoxy concrete end caps provided the best protection to the end anchorages of all methods tested; and the post-tensioning wires in the beams experienced no caps failures; the epoxy concrete end caps provided the best protection to the end anchorages of all methods tested; and the post-tensioning wires in the beams experienced no structural damage over the exposure period provided they were encased in a flexible metal conduit and protected with portland cement grout. GRA

N82-33770# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
SOME VIBRATING MEMBRANE EQUATIONS FOR THE LINEAR ESTIMATION OF TWO DIMENSIONAL ISOTROPIC RANDOM FIELDS
Bernard C. Levy and John N. Tsitsiklis Mar. 1982 39 p refs
(Contracts N00014-81-K-0191; N00014-77-C-0532; Grant NSF ECS-80-12608; NR Proj. 041-519)
(AD-A116959; LIDS-P-1192) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper considers the problem of estimating a two-dimensional isotropic random field given some noisy observations of this field over a disk of finite radius. By expanding the field and observations in Fourier series, and exploiting the covariance structure of the resulting Fourier coefficient processes, some vibrating equations are obtained for estimating the random field. These equations provide a set of recursions for constructing the field estimates as the radius of the observation disk increases. In the spectral domain, these recursions take the form of Schrodinger

equations which can be viewed as being associated to an inverse scattering problem. Author (GRA)

N82-33771# Minnesota Univ., Minneapolis. Dept. of Electrical Engineering.
ACOUSTIC STRAIN VISUALIZATION IN STRUCTURAL MATERIALS Final Report, Sep. 1980 - Mar. 1982
Rolf K. Mueller 1982 51 p refs
(Contract F49620-80-C-0102; ARPA Order 4049; AF Proj. 4049)
(AD-A116992; AFOSR-82-0547TR) Avail: NTIS HC A04/MF A01 CSCL 14/2

An experimental acousto-optic time of flight measurement system has been designed and built. In this system an acoustic pulse is launched through a material and the time of transit is measured by optical observation of the arrival time. A timing accuracy of plus or minus 80 P Sec was demonstrated which is 50 times more sensitive than that required to indicate residual stresses in steel on the order of 1,000 PSI. Unfortunately, experimental difficulties precluded the measurement of residual stresses in the test piece. Author (GRA)

N82-33772# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Automatic Data Processing Center.
A THREE-DIMENSIONAL STABILITY ANALYSIS/DESIGN PROGRAM (3DSAD). REPORT 3. GENERAL ANALYSIS MODULE (CGAM)
Fred T. Tracy and Charles W. Kling Jun. 1982 60 p refs
(AD-A117387; WES-INSTRUCTION-K-80-4) Avail: NTIS HC A04/MF A01 CSCL 13/13

This report describes the General Analysis Module of the three dimensional stability analysis/design (3DSAD) program. The module performs overturning, bearing (base pressure), and sliding computations for a structure. The report presents both a user's guide and a theoretical discussion for the module. GRA

N82-33773# Pennsylvania State Univ., University Park. Applied Research Lab.
ELASTIC/PLASTIC FINITE ELEMENT ANALYSIS OF A SINGLE EDGE-CRACKED BEAM SUBJECTED TO MODE 1 TENSILE LOADING M.S. Thesis
Edward Paul Moskal 24 May 1982 56 p refs
(Contract N00024-79-C-6043)
(AD-A117622; ARL/PSU/TR-82-131) Avail: NTIS HC A04/MF A01 CSCL 20/11

A thorough analysis of the stresses, strains and displacements surrounding the crack tip of a single edge-cracked beam subjected to Mode I tensile loading was performed by constructing various two-dimensional finite element models. Of particular interest in the analysis was: (1) determination of the Mode I stress intensity factor in the elastic models and (2) examination of the size and character of the plastic zone in the elastic-perfectly plastic models. The finite element program used in the investigation was BOPACE-3D (The Boeing Plastic Analysis Capability for Engines). In order to model the singularity effects at the crack tip, special crack tip elements were utilized immediately surrounding the crack tip. Different crack tip elements were used for the elastic models and the elastic-perfectly plastic models. Both coarse and fine-grid meshes were evaluated in the analysis. The finite element model results are compared to various other solutions. Results for the elastic models are compared to available empirical solutions while the elastic-perfectly plastic results are examined with regard to extent and character of the elastic-plastic region. Author (GRA)

N82-33774# Rutgers - The State Univ., New Brunswick, N. J. Dept. of Mechanics and Materials Science.
NONDESTRUCTIVE METHOD FOR DETERMINING FATIGUE AND STRESS-CORROSION DAMAGE Final Report
I. R. Kramer (Naval Ship Res. & Develop. Center, Annapolis) and S. Weissmann Bethesda, Md. Naval Ship Research and Development Center Jul. 1982 22 p refs
(Contract N00600-77-C-1134; ZR0220101)
(AD-A117631; DTNSRDC-82/051) Avail: NTIS HC A02/MF A01 CSCL 14/2

The distribution of dislocations in the surface layer and the interior of fatigued and stress-corrosion damaged specimen was determined by X-ray line broadening techniques. The data indicate that in both cases the dislocation density in the region of the surface is higher than that in the interior initially. With increasing damage the dislocation density in the interior increases rapidly and finally becomes equal to that of the surface. A crack or fracture occurs when this condition is fulfilled. The ratio of the dislocation density in the surface and the interior can provide a measure of the damage caused by fatigue and stress corrosion. Measurements of fatigue and stress-corrosion damage by the X-ray technique agreed closely with the measured damage. Author (GRA)

N82-33775# New Mexico Univ., Albuquerque. Engineering Research Inst.
REINFORCED CONCRETE MODELING Final Report
H. L. Schreyer and J. W. Jeter, Jr. Kirtland AFB, N. Mex. AFWL Jul. 1982 88 p refs
(Contract F29601-81-C-0013; AF Proj. 8809)
(AD-A117925; AFWL-TR-82-9; NMERI-TA-8-9) Avail: NTIS HC A05/MF A01 CSCL 11/2

Significant aspects of plain concrete behavior under large dynamic loading were identified and used to evaluate current concrete models. Since the endochronic and viscoplastic models provide satisfactory descriptions of many significant features of concrete behavior, they were chosen for detailed study. Both models compared well with existing experimental data. To illustrate that both models were operational and that numerical analyses could be performed, a preliminary finite element analysis was performed for a beam column with a monotonically increasing lateral displacement as a loading function. This fundamental work establishes the foundation for a development effort that addresses the problems of steel-concrete interaction, rate effects, and the analysis of reinforced concrete structures. Author (GRA)

N82-33776# Oklahoma Univ., Norman. School of Aerospace Mechanical and Nuclear Engineering.
MECHANICS OF BIMODULAR COMPOSITE STRUCTURES
C. W. Bert and J. N. Reddy (Virginia Polytechnic Inst. and State Univ.) Jul. 1982 19 p refs
(Contract N00014-78-C-0647)
(AD-A117942; OU-AMNE-82-4; TR-28; VPI-E-82.20) Avail: NTIS HC A02/MF A01 CSCL 11/9

This report is a survey of the mechanics of beam and plate structures laminated of fiber-reinforced composite materials having different elastic and thermoelastic properties in tension and compression. Examples of such materials include tire cord-rubber, wire-reinforced solid propellants, and soft biological materials. Specific topics covered include: mathematical models of fiber-reinforced bimodular materials and their experimental verification; static and dynamic analysis of laminated and sandwich beams; plane elasticity; analysis of deflection and free and transient vibration of laminated plates and shells. In all of these analyses, thickness-shear deformation and rotatory inertia are included. The solution methods used include closed-form, transfer-matrix, and finite-element techniques. Author (GRA)

N82-33777# Oklahoma Univ., Norman. School of Aerospace Mechanical and Nuclear Engineering.
ANALYSES OF BEAMS CONSTRUCTED OF NONLINEAR MATERIALS HAVING DIFFERENT BEHAVIOR IN TENSION AND COMPRESSION
C. W. Bert and F. Gordaninejad Jul. 1982 74 p refs
(Contract N00014-78-C-0647)
(AD-A117944; OU-AMNE-82-5; TR-30) Avail: NTIS HC A04/MF A01 CSCL 13/13

This report consists of two parts. In part 1, a transfer-matrix analysis is presented for determining the static behavior of thick beams of 'multimodular materials' (i.e., materials which have different elastic behavior in tension and compression, with nonlinear stress-strain curves approximated as piece-wise linear, with four or more segments). To validate the transfer-matrix method results, a closed-form solution is also presented for cases in which the

neutral-surface location is constant along the beam axis.
Author (GRA)

N82-33778# Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
ANALYTICAL AND EXPERIMENTAL INVESTIGATIONS OF BIMODULAR COMPOSITE BEAMS
Charles W. Bert, Clarence A. Rebello, and C. J. Rebello Jul. 1982 84 p refs
(Contract N00014-78-C-0647)
(AD-A117945; OU-AMNE-82-2; TR-26) Avail: NTIS HC A05/MF A01 CSCL 13/13

This study deals with both analytical and experimental investigations of sandwich beams with cores of polyurethane foam and facings of unidirectional cord-rubber, which is bimodular (i.e., having drastically different behavoir in compression as compared to tension). This work is believed to be the first devoted to vibration of bimodular materials in a sandwich configuration. Two different analyses are presented: one is a sandwich version of the well-known Timoshenko beam theory, which results in a fourth-order flexural differential equation. The other is a refinement of the DiTaranto-Mead-Markus sixth-order theory with the addition of rotatory inertia. Theoretical and experimental results are presented for the frequencies of the first three modes of vibration for a pin-ended beam without axial restraint. GRA

N82-33779# Stanford Univ., Calif. Div. of Applied Mechanics.
THE ANALYSIS OF ELASTIC-PLASTIC DEFORMATION AND STRESS AT FINITE STRAIN AND THEIR EVALUATION Final Report, 1 Oct. 1980 - 31 Dec. 1981
E. H. Lee and R. L. Mallett 7 Jul. 1982 10 p refs
(Contract DAAG29-81-K-0002)
(AD-A117505; ARO-17689.2-EG) Avail: NTIS HC A02/MF A01 CSCL 12/1

Several aspects of elastic-plastic analysis relevant to technological applications which have been investigated on the project are discussed. References to the reports or papers dealing with these aspects are given. The topics are: (1) the generation of residual stress in metal-forming processes, in particular extrusion; (2) finite-deformation elastic-plastic theory based on the nonlinear coupled kinematics; (3) stress analysis in the presence of anisotropic hardening, in particular kinematic hardening; and (4) computer program development to improve accuracy and generality. Author (GRA)

N82-33780# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
THREE-DIMENSIONAL FINITE-ELEMENT ANALYSIS OF LAYERED COMPOSITE STRUCTURES
W. C. Chao, N. S. Putcha, and J. N. Reddy Jul. 1982 14 p refs
(Contract N00014-78-C-0647; NR Proj. 064-609)
(AD-A117492; VPI-E-82.19; TR-29) Avail: NTIS HC A02/MF A01 CSCL 13/13

Part 1 of the report is concerned with the large deformation bending of laminated composite shells by the 'degenerate' three dimensional element. The present results agree well with the results available in the literature. Part 2 of the report is concerned with the full three-dimensional finite-element analysis of laminated anisotropic composite plates. The present linear analysis results compare favorably with those presented by Pagano. Author (GRA)

N82-33781# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Polymers Branch.
KQ MEASUREMENTS WITH RHEOMETRICS MECHANICAL SPECTROMETER Final Report, Mar. - Dec. 1981
C. Y-C. Lee and W. B. Jones, Jr. May 1982 48 p refs
(AF Proj. 2419)
(AD-A117903; AFWAL-TR-82-4014) Avail: NTIS HC A03/MF A01 CSCL 14/2

A testing method to measure the fracture toughness properties KO, which is related to a specific sample geometry and dimensions (half-inch compact tension), has been established using the Rheometrics Mechanical Spectrometer (RMS) as the loading instrument. This particular sample size was chosen so that the testing could be incorporated as part of a 50 gram evaluation scheme which was designed to provide systematic, preliminary properties information of new resins. The RMS was chosen for the experiment because of its unique temperature capabilities. Neat specimens of Narmco-5208 Epoxy have been fracture tested at temperatures between -150 degrees C to 250 degrees C and interesting fracture behavior was observed. The fracture surfaces relating to these fractures were studied using Scanning Electron Microscope. Author (GRA)

N82-33782# Naval Ship Research and Development Center, Bethesda, Md. Computation Mathematics and Logistics Dept.
NASTRAN AND FEARS ANALYSIS OF TWO PROBLEMS OF PLANE ELASTICITY
Donald A. Gignac and Ivo Babuska Jul. 1982 53 p refs
(ZR0140201)
(AD-A117713; DTNSRDC/CMLD-82/17) Avail: NTIS HC A04/MF A01 CSCL 20/11

This report investigates the plane stress capability of the FEARS (Finite Element Adaptive Refinement Solver) program which features both adaptive meshing and a posteriori error bounding. Two benchmark plane stress problems were solved by both the FEARS and NASTRAN (NASA Structural Analysis) programs for comparison. This report presents only the basic computational results. Other reports to follow shortly will motivate the experimental procedures, analyze the results, and provide the conclusion.
Author (GRA)

N82-33783# Systems Research Labs., Inc., Dayton, Ohio. Research Applications Div.
FINITE-ELEMENT ANALYSIS OF SOME FULL- AND PARTIAL-RING CRACK-PROPAGATION TEST SPECIMENS Final Report, Jun. 1979 - May 1981
Noel E. Ashbaugh and Jalees Ahmad Wright-Patterson AFB, Ohio AFWAL Mar. 1982 63 p refs
(Contract F33615-79-C-5025; AF Proj. 2307)
(AD-A117674; AFWAL-TR-82-4015) Avail: NTIS HC A04/MF A01 CSCL 20/12

Ring-shaped specimens containing cracks are analyzed by a finite-element method. Results are obtained for the stress-intensity factor and the deformation or compliance of the specimen at locations which are convenient for experimental measurement. The specimens which are analyzed are the full-ring geometries under tensile and compressive loads having a single or double crack emanating from the inner radius, with the crack plane perpendicular to the load line for tensile loads and coinciding with the load line for compressive loads. A modified C-specimen and half rings under tensile loads having a single crack are analyzed. Results are obtained for various crack lengths and aspect ratios (inner radius divided by outer radius) equal to 0.5, 0.333, and 0.25. The results for the modified C-specimen are determined only for an aspect ratio of 0.5. Functional expressions are given for the stress-intensity factor and the compliance for the single-crack ring tension specimen and the modified C-specimen. Author (GRA)

N82-33784# Army Tank-Automotive Research and Development Command, Warren, Mich.
CHARACTERIZATION OF ADHESIVELY BONDED ALUMINUM ARMOR THROUGH QUALITATIVE ANALYTICAL TECHNIQUES Final Report, Jul. 1982 - Mar. 1982
M. J. King, T. J. Kler, and D. T. Ostberg Apr. 1982 17 p refs
(DA Proj. 1L1-61101-A-91-A)
(AD-A117710; TACOM-TR-12648) Avail: NTIS HC A02/MF A01 CSCL 19/4

Aluminum armor 5083, single lap shear coupons were joined with generic epoxy and urethane adhesive to determine the adhesive effectiveness. Chemical treatment of the aluminum substrate with Methyl Ethyl Ketone (MEK) was also examined to determine its effect on the shear strength. The tests were conducted under atmospheric pressure and a temperature of 70 degrees + or - 5 degrees F. Shear strength results indicate that, when applied to an untreated or MEK treated surface with a

60 + or - 10 microns inch finish, both epoxy and urethane are unacceptable for aluminum armor 5083 bonding. Author (GRA)

N82-33785# Bendix Corp., Kansas City, Mo.
SEMIRIGID COAXIAL RF CABLE BENDING TECHNIQUES Final Report
W. S. McCleave May 1982 14 p
(Contract DE-AC04-76DP-00613)
(DE82-016029; BDX-613-2650) Avail: NTIS HC A02/MF A01

Bending characteristics of semirigid coaxial RF cables were established. The required cable configuration sometimes has large radial bends. To compensate for spring-back, cables must be overbent such that the relaxed cable yields the correct shape. Aluminum discs were used as bending mandrels. The cables were bent to various radii and arc lengths. Their spring-back was measured and the values were graphed. The graphs are used as a guideline in cable bending tool design. DOE

N82-33786# Sandia Labs., Albuquerque, N. Mex. Thermomechanical and Physical Div.
INSTABILITY IN SIMPLE SHEAR DEFORMATION OF STRESS-SOFTENING MATERIALS
Timothy J. Burns and Timothy G. Trucano Mar. 1982 35 p refs
(Contract DE-AC04-76DP-00789)
(DE82-013525; SAND-82-0004) Avail: NTIS HC A03/MF A01

A quasistatic stability analysis for a stress softening material undergoing dynamic one dimensional simple shear is described. This analysis is basically algebraic in nature and deals strictly with the underlying linearized problem. A simple algebraic criterion for the onset of instability is developed. An application of the criterion to two steels is then made and compared with experimental data, and qualitative agreement is observed. The analysis is then refined in a special case to include the time dependence of the underlying parallel flow in the stability method. For a simple constitutive assumption (that of a thermoviscous material), it is found that the refined analysis can yield a somewhat different stability criterion than the quasistatic analysis. The importance of this for the problem under consideration is also discussed. DOE

N82-33787# Technical Research Centre of Finland, Espoo. Dept. of Building Technology and Community Development.
INVESTIGATIONS ON THE IMPROVEMENT OF CORROSION RESISTANCE AND STRENGTH OF RIBBED REINFORCING STEEL BARS IN CONCRETE, ESPECIALLY WHEN SUBJECT TO FATIGUE LOADING Ph.D. Thesis
Antti Kari 1980 83 p refs
(PB82-204330; Publ-17; ISBN-951-38-0935-8; ISSN-0355-337X)
Avail: NTIS HC A05/MF A01 CSCL 13C

The fatigue behavior of the ribbed reinforcing steel a 400 H is studied, concentrating on the possibilities for improving the fatigue strength in corrosive environments. The surface treatments of the steel bars were shot peening, hot dip galvanizing and spray galvanizing. The test bars used in the fatigue tests were both exposed and in concrete. The corrosion slution was synthetic sea water according to DIN 50900. A statistical method is proposed for the evaluation of the fatigue properties in ambient air and corrosion fatigue tests using S-N curves. GRA

N82-33788# Texas Univ., Austin. Dept. of Civil Engineering.
AN EXPERIMENTAL STUDY OF BOLTED SHEAR CONNECTIONS Final Report, 5 Feb. 1976 - 1 Jun. 1981
K. H. Frank and J. A. Yura Dec. 1981 246 p refs
(Contract DOT-FH-11-8900)
(PB82-201518; FHWA/RD-81/148) Avail: NTIS HC A11/MF A01 CSCL 13B

Statistically reliable slip loads for bolted shear connections with coated contact surfaces were developed. Four different painting systems were evaluated for use in friction type connections. Variables included were paint thickness, size of hole type of steel, and magnitude of clamping force. An efficient and reliable slip test setup was developed. Additional creep and fatigue tests on bolted butt splices were used to evaluate the suitability of the painting systems for bridges. Some large bolted connections were tested to evaluate the applicability of the single fastener slip test to multibolt connections. Ultimate load tests to determine the effect of underdeveloped fillers on bolt shear strength and the interaction between bolt shearing stress and plate tensile stress are reported. The test program is used to develop design recommendations for friction connections for the AASHTO bridge specifications with coated faying surfaces. GRA

N82-33562# Stress Technology, Inc., Rochester, N.Y.
THE LITERATURE OF VIBRATION ENGINEERING
N. F. Rieger *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 14, No. 1 Jan. 1982 p 5-14 refs (For primary document see N82-33561 24-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington D.C. 20375 CSCL 20/11

42 GEOSCIENCES (GENERAL)

N82-33789*# National Aeronautics and Space Administration, Washington, D. C.
ACTIVITIES IN PLANETARY GEOLOGY FOR THE PHYSICAL AND EARTH SCIENCES
Richard DAlli (Arizona State Univ., Tempe) and Ronald Greeley (Arizona State Univ., Tempe) 1982 183 p refs
(NASA-EP-179; NAS 1.19:179) Avail: NTIS HC A09/MF A01 CSCL 08G

A users guide for teaching activities in planetary geology, and for physical and earth sciences is presented. The following topics are discussed: cratering; aeolian processes; planetary atmospheres, in particular the Coriolis Effect and storm systems; photogeologic mapping of other planets, Moon provinces and stratigraphy, planets in stereo, land form mapping of Moon, Mercury and Mars, and geologic features of Mars. E.A.K.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N82-33790 Illinois Univ., Urbana-Champaign.
APPLICABILITY OF FACTOR ANALYSIS TO THE DETERMINATION OF MINERAL MATTER IN COAL Ph.D. Thesis
Bradley Albert Roscoe 1981 195 p
Avail: Univ. Microfilms Order No. DA8203570

A method for determining the characteristics of the mineral matter in coal was developed based on two types of factor analysis. Classical factor analysis was shown to identify trends in data sets that are indicative of the mineral phases and data errors. If a data error was identified by classical factor analysis, appropriate corrective action produced a data set with only experimental errors present that could be used for further analysis. Target transformation factor analysis (TTFA) was then used to quantitatively identify the elemental distribution of the minerals in coal. An iterative approach to TTFA was developed and demonstrated to identify mineral phases without prior information concerning the phases. A set of data from Borax Lake, California was used to show how one could start with unique vectors for elemental profiles and obtain physically real elemental distributions for mineral phases. Comparisons were made to show the effect of using different weighting matrices in the iteration process and hence the advantage of weighting the target tranformation rotatons. Dissert. Abstr.

N82-33791 California Inst. of Tech., Pasadena.
PART 1: ANCIENT ARCTIC ICE DOES NOT CONTAIN LARGE EXCESSES OF NATURAL LEAD. PART 2: CHRONOLOGICAL VARIATIONS IN LEAD AND BARIUM CONCENTRATIONS AND

LEAD ISOTOPIC COMPOSITIONS IN SEDIMENTS OF FOUR SOUTHERN CALIFORNIA OFF-SHORE BASINS Ph.D. Thesis
Chihang Amy Ng 1982 113 p
Avail: Univ. Microfilms Order No. 8203363

Concentrations of lead and potassium were determined in a series of ice samples taken in sequence from the outside to the interior of several > 2000 year old ice cores drilled from the Greenland And Antarctic ice sheets. Concentrations of lead and potassium were observed to decrease continuously in going from the exterior to the interior of the cores, which indicated that surface contamination had penetrated to the interior of the core, making it impossible to determine the original concentration of lead in the ice. Concentrations measured at the centers of these cores must therefore represent upper limits of lead concentration originally present in the ice. These data verify that the present-day excess of lead above natural levels is caused by industrial lead emissions to the atmosphere. The chronological changes of lead and barium fluxes from the Los Urban Complex to adjacent San Nicolas, Santa Barbara, Santa Monica, and San Pedro coastal basins were documented and industry were identified as the source of the excess lead and barium. Dissert. Abstr.

N82-33792*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EVALUATION OF SPATIAL FILTERING ON THE ACCURACY OF WHEAT AREA ESTIMATE
Nelson deJesusParada, Principal Investigator, Mauricio Alves Moreira, Sherry Chou Chen, and Angela Maria deLima Jun. 1982 10 p refs Presented at the 16th Intern. Symp. on Remote Sensing of Environ., Buenos Aires, 2-9 Jun. 1982 Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E82-10292; NASA-CR-169335; NAS 1.26:169335;
INPE-2431-PRE/135) Avail: NTIS HC A02/MF A01 CSCL 02C

A 3 x 3 pixel spatial filter for postclassification was used for wheat classification to evaluate the effects of this procedure on the accuracy of area estimation using LANDSAT digital data obtained from a single pass. Quantitative analyses were carried out in five test sites (approx 40 sq km each) and t tests showed that filtering with threshold values significantly decreased errors of commission and omission. In area estimation filtering improved the overestimate of 4.5% to 2.7% and the root-mean-square error decreased from 126.18 ha to 107.02 ha. Extrapolating the same procedure of automatic classification using spatial filtering for postclassification to the whole study area, the accuracy in area estimate was improved from the overestimate of 10.9% to 9.7%. It is concluded that when single pass LANDSAT data is used for crop identification and area estimation the postclassification procedure using a spatial filter provides a more accurate area estimate by reducing classification errors. Author

N82-33793*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE USE OF LANDSAT DATA TO MONITOR THE URBAN GROWTH OF SAO PAULO METROPOLITAN AREA
Nelson deJesusParada, Principal Investigator, Madalena Niero, Magda Adelaids Lombardo, and Celina Foresti Jun. 1982 12 p refs Sponsored by NASA ERTS
(E82-10294; NASA-CR-169336; NAS 1.26:169336;
INPE-2430-PRE/134) Avail: NTIS HC A02/MF A01 CSCL 08B

Urban growth from 1977 to 1979 of the region between Billings and the Guarapiranga reservoir was mapped and the problematic urban areas identified using several LANDSAT products. Visual and automatic interpretation techniques were applied to the data. Computer compatible tapes of LANDSAT multispectral scanner data were analyzed through the maximum likelihood Gaussian algorithm. The feasibility of monitoring fast urban growth by remote sensing techniques for efficient urban planning and control is demonstrated. J.D.

N82-33794*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF ATMOSPHERIC DIFFUSION USING LANDSAT [ESTUDO DA DIFUSAO ATMOSFERICA USANDO IMAGENS DO SATELITE LANDSAT]
Jose Aparecido Torsani and Yelissety Viswanadham Feb. 1982 32 p refs In PORTUGUESE Submitted for publication Sponsored by NASA Original contains color illustrations
(NASA-CR-169325; INPE-2335-PRE/082) Avail: NTIS HC A03/MF A01 CSCL 04A

The parameters of diffusion patterns of atmospheric pollutants under different conditions were investigated for use in the Gaussian model for calculation of pollution concentration. Value for the divergence pattern of concentration distribution along the Y axis were determined using LANDSAT images. Multispectral scanner images of a point source plume having known characteristics, wind and temperature data, and cloud cover and solar elevation data provided by LANDSAT, were analyzed using the 1-100 system for image analysis. These measured values are compared with pollution transport as predicted by the Pasquill-Gifford, Juelich, and Hoegstroem atmospheric models.
Transl. by J.D.

N82-33795*# Environmental Research Inst. of Michigan, Ann Arbor. Applications Div.
CARTOGRAPHIC MAPPING STUDY Final Report, 20 Dec. 1981 - 20 Jun. 1982
Charles Wilson, Robert Dye, and Larry Reed Jun. 1982 78 p refs
(Contract NAS5-26820)
(NASA-CR-170446; NAS 1.26:170446; ERIM-160700-1-F) Avail: NTIS HC A05/MF A01 CSCL 08B

The errors associated with planimetric mapping of the United States using satellite remote sensing techniques are analyzed. Assumptions concerning the state of the art achievable for satellite mapping systems and platforms in the 1995 time frame are made. An analysis of these performance parameters is made using an interactive cartographic satellite computer model, after first validating the model using LANDSAT 1 through 3 performance parameters. An investigation of current large scale (1:24,000) US National mapping techniques is made. Using the results of this investigation, and current national mapping accuracy standards, the 1995 satellite mapping system is evaluated for its ability to meet US mapping standards for planimetric and topographic mapping at scales of 1:24,000 and smaller. Author

N82-33796*# Bionetics Corp., Hampton, Va.
NORSEX 1979 MICROWAVE REMOTE SENSING DATA REPORT Summary Report, 29 Sep. - 12 Oct. 1979
Harold F. Hennigar and Sally K. Schaffner May 1982 223 p refs
(Contract NAS1-16978)
(NASA-CR-165967; NAS 1.26:165967) Avail: NTIS HC A10/MF A01 CSCL 05B

Airborne microwave remote sensing measurements obtained by NASA Langley Research Center in support of the 1979 Norwegian Remote Sensing Experiment (NORSEX) are summarized. The objectives of NORSEX were to investigate the capabilities of an active/passive microwave system to measure ice concentration and type in the vicinity of the marginal ice zone near Svalbard, Norway and to apply microwave techniques to the investigation of a thermal oceanic front near Bear Island, Norway. The instruments used during NORSEX include the stepped frequency microwave radiometer, airborne microwave scatterometer, precision radiation thermometer and metric aerial photography. The data are inventoried, summarized, and presented in a user-friendly format. Data summaries are presented as time-history plots which indicate when and where data were obtained as well as the sensor configuration. All data are available on nine-track computer tapes in card-image format upon request to the NASA Langley Technical Library. A.R.H.

N82-33797# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.
SEASAT SATELLITE RADAR ALTIMETRY DATA PROCESSING SYSTEM

Gladys B. West May 1981 32 p
(AD-A115972; NSWC-TR-81-234) Avail: NTIS HC A03/MF A01 CSCL 09/2

Measurements from the SEASAT satellite radar altimeter are combined with the Doppler precise orbit, corrected for atmospheric and environmental effects, and reduced to along-track geoid heights and vertical deflections by an adaptive Kalman smoother, which is based upon a third-order Markov process. The altimeter data processing system at the Naval Surface Weapons Center (NSWC) is described in this report. Author (GRA)

N82-33798# Susquehanna Resources and Environment, Inc., Johnson City, N.Y.
APPLICATIONS OF TEXTURE ANALYSIS FOR ROCK TYPES DISCRIMINATION Final Technical Report, 6 Jul. 1981 - 5 Apr. 1982
Shin-yi Hsu Jun. 1982 51 p refs
(Contract F49620-81-C-0087; AF Proj. 2309; ARPA Order 4288)
(AD-A117076; AFOSR-82-0549TR) Avail: NTIS HC A04/MF A01 CSCL 14/5

Aimed at developing image processing methods for rock types analysis with LANDSAT data, numerous experiments were conducted using supervised and unsupervised classification techniques under the general concept of texture analysis with LANDSAT digital covering two geological quads of Nevada. The results indicate that the supervised classification method is very effective in the extraction of granite regions when: (1) data were in ratio format; (2) feature variables included both tone and texture information; and (3) the classifier is capable of handling non-normally distributed data. Classification errors occurred when there exists pixels of non-granite category whose spectral and textural properties are statistically similar to that of granite pixels. Two cases of errors can be noted: Type 1 pixels located at the periphery of the granite regions, and Type 2 pixels located far away from the core of the granite areas. The final decision regarding the delineation of the granite regions is based on the intersection of two classification maps using a simple map overlay analysis. The result yields a correct classification rate of about 95 percent based on a visual comparision between the composite classification map and the ground truth information given in the U.S.G.S. geological map of the study area. GRA

N82-33799# Army Engineer Topographic Labs., Fort Belvoir, Va.
AN ANALYSIS OF THE MAX-MIN TEXTURE MEASURE
Michael A. Crombie, Robert S. Rand, and Nancy Friend Jan. 1982 45 p
(DA Proj. 4A7-62707-A-855)
(AD-A116768; ETL-0280) Avail: NTIS HC A03/MF A01 CSCL 14/5

The Max-Min texture measure was tested in an auto evaluation experiment and found to be an excellent signature for discriminating among several natural features and for isolating cultural detail from natural detail. This is especially true if the classification results are refined by a relaxation labeling exercise. Author (GRA)

N82-33800# WAPORA, Inc., Earth City, Mo.
TERRESTRIAL BIOLOGICAL INVENTORY, HILLVIEW DRAINAGE AND LEVEE DISTRICT, GREENE AND SCOTT COUNTIES, ILLINOIS Final Report
Richard Kubb, Rosetta Arrigo, and John Ebinger Jan. 1982 105 p refs
(Contract DACW43-81-M-3145)
(AD-A115911) Avail: NTIS HC A05/MF A01 CSCL 06/6

A qualitative evaluation of the terrestrial biological resources within the Hillview Drainage and Levee District, Greene and Scott Counties, Illinois was performed. Field reconnaissance, habitat mapping, and consultation with recognized authorities were combined to present an overview of the existing plant and animal communities within the District. The various habitats were analyzed with regard to their abilities to support wildlife. Land within the Hillview Drainage and Levee District is used primarily for agricultural purposes. The major terrestrial habitats in the District are cultivated fields, shrubby vegetated areas adjacent to drainage ditches and bordering creeks, and a bottomland forest between the riverfront levee and the Illinois River. The bottomland forest is classified as a Palustrine Forested Wetland. A total of 222 plant species and 40 vertebrate species were observed in the Hillview Drainage and Levee District. Of the vertebrates, 33 were avian, 5 were mammalian, and 2 were amphibian species. The habitats most capable of supporting wildlife are the bottomland forest and the border vegetation adjacent to the ditches and creeks. Local residents use both of these habitats for hunting. The bottomland forest provides habitat for deer, squirrels, and other game species. GRA

N82-33801# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
SEA ICE RUBBLE FORMATIONS IN THE BERING SEA AND NORTON SOUND, ALASKA
Austin Kovacs Dec. 1981 27 p refs
(AD-A113773; CRREL-SR-81-34) Avail: NTIS HC A03/MF A01 CSCL 08/12

The occurrence of large, grounded pressure ridge formations up to 15 m high in the coastal waters of Norton Sound and the Bering Sea is discussed. These formations periodically float free and drift about, gouging the seabed. Their mass makes them a severe threat to both floating and bottom-founded structures in these waters. Author (GRA)

N82-33802# Dayton Univ., Ohio.
THE ROUGHNESS LENGTHS ASSOCIATED WITH REGIONS OF HETEROGENEOUS VEGETATION AND ELEVATION Final Report, 1 Oct. 1980 - 31 Mar. 1981
Charles D. MacArthur and Patrick A. Haines White Sands Missile Range, N. Mex. Atmospheric Sciences Lab. May 1982 41 p refs
(Contract DAAD07-80-D-0206; DA Proj. 1L2-62111-AH-71)
(AD-A117409; ERADCOM/ASL-CR-82-0206-1) Avail: NTIS HC A03/MF A01 CSCL 08/2

Algorithms for calculating seasonal roughness lengths from digitized descriptions of surface vegetation and man-made objects are described. The 'monthly characteristic vegetation roughness' for a one square kilometer plat is a log average of 100 roughness lengths, which correspond to the vegetation codes. Seasonal histograms for each square kilometer were also computed. The concept of a roughness length due to changes in elevation is used to derive an algorithm for its calculation. Both algorithms were used to compute roughness lengths for two regions of Central Europe. Region A contained 12,000 square kilometers of elevation and vegetation data at 100 meter intervals. Both types of roughness length were calculated for this region. Region B contained nearly 400,000 square kilometers of elevation data at a 63.5 meter interval. Region B includes region A. In region B only roughness lengths due to elevation change were calculated. The calculated vegetation and elevation roughness lengths in region A were compared. The elevation roughness lengths are generally greater than those due to vegetation in hilly country. The elevation roughness lengths of region A and region B were also compared. It is concluded that the elevation roughness algorithms are sensitive to the horizontal interval between data points. GRA

N82-33803# Technische Univ., Graz (Austria). Inst. for Applied Geodesy and Photogrammetry.
REGISTRATION OF DIGITIZED AERIAL PHOTOGRAPHY WITH A DIGITAL MAP DATA BASE Final Report, Oct. 1979 - Jan. 1982
Franz W. Leberl and Hubert Ranziger 15 Jan. 1982 105 p refs
(Contract DAJA37-80-C-0020; DA Proj. 1T1-61102-BH-57)
(AD-A117510) Avail: NTIS HC A06/MF A01 CSCL 08/2

The feasibility of automatic registration of a digital aerial image with existing map data bank is investigated. The geometry of an aerial image can be modelled mathematically by a central perspective. The background of this model various strategies to solve the problem of resection in space are discussed. A method to recognize automatically areal features of the map in the image and to extract control points for the reconstruction of the imaging configuration is proposed. Recognition is done by three algorithms:

by correlation, by thresholding and by adaption of a binary mask. Estimates for the distance of projected features from actual objects and dislocations caused by variation of the transformation parameters are given. Experiments performed with an actual aerial photograph are included. Author

N82-33804# Defense Mapping Agency Aerospace Center, St. Louis, Mo.
MEASURING THE FRACTURE DIMENSIONS OF EMPIRICAL CARTOGRAPHIC CURVES
Mark C. Shelberg, Harold Moellering, and Nina Lam 1982 13 p refs
(AD-A117498) Avail: NTIS HC A02/MF A01 CSCL 08/2

This paper discusses an algorithm, which simulates walking a pair of dividers along a curve, used to calculate the fractal dimensions of curves. It also discusses the choice of chord length and the number of solution steps used in computing fracticality. Results demonstrate the algorithm to be stable and that a curve's fractal dimension can be closely approximated. Potential applications for this technique include a new means for curvilinear data compression, description of planimetric feature boundary texture for improved realism in scene generation and possible two-dimensional extension for description of surface feature textures. GRA

N82-33805# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY: ALTURAS QUADRANGLE, CALIFORNIA Final Report
May 1981 110 p refs Prepared for Bendix Field Engineering Corp., Grand Junction, Colo.
(Contract DE-AC13-76GJ-01664)
(DE82-005539; GJBX-406-81-Vol-1) Avail: NTIS HC A06/MF A01

An airborne high sensitivity gamma-ray spectrometer and magnetometer survey was conducted over ten (10) areas over northern California and south western Oregon. These include the 20 x 10 NTMS quadrangles of Roseburg, Medford, Weed, Alturas, Redding, Susanville, Ukiah, and Chico along with the 10 x 20 areas of the Coos Bay quadrangle and the Crescent City/Eureka areas combined. This report discusses the results obtained over the Alturas, California, map area. Traverse lines were flown in an east-west direction at a line spacing of six (6) miles. Tie lines were flown north-south approximately eighteen (18) miles apart. A total of 16,880.5 line miles of geophysical data were acquired, compiled, and interpreted during the survey, of which 1631.6 line miles are in this quadrangle. The purpose of this study is to acquire and compile geologic and other information with which to assess the magnitude and distribution of uranium resources and to determine areas favorable for the occurrence of uranium in the United States. DOE

N82-33806# Bendix Field Engineering Corp., Grand Junction, Colo.
GRAND JUNCTION AREA OFFICE, UNITED STATES DEPARTMENT OF ENERGY 1980/1981 ACTIVITIES REPORT
Mar. 1982 70 p
(Contract DE-Ac13-76GJ-01664)
(DE82-009638; GJBX-11-82) Avail: NTIS HC A04/MF A01

Geologic, geochemical, geophysical, and other data were acquired which contributed to assessment of the distribution and magnitude of uranium resources of the United States as well as to determination of areas favorable for the occurrence of uranium and to establishment of potential resource estimates. The data collection phase of the NURE program was organized around six major activity elements: quadrangle evaluation, data acquisition, resource assessment, geologic studies, technology applications, and mineral economics. This fifth activities report presents summary results on work performed during the period 1980/1981 in each of these element areas, together with appendices that cite individual project data and resulting reports. By the end of 1981, evaluation of an additional 28 quadrangles had been completed, bringing to 163 the total number covered by the NURE program. DOE

N82-33807# Science Applications, Inc., Golden, Colo.
FLOW CHARACTERISTICS IN GEOPRESSURED ZONES AND SALT WATER AGULFERS Annual Report, Sep. 1980 - Aug. 1981
Bahram Amirijafari, Fred Rigby, and W. E. Simmons Sep. 1981 93 p refs Sponsored by Gas Research Inst.
(PB82-181280; GRI-81/0041) Avail: NTIS HC A05/MF A01 CSCL 08I

A simple numerical model was developed to investigate the effects of gas evolution in geopressured flow and was used to study the combined effects of production strategy, completion design, and aquifer characteristics on production and reinjection. Well cost estimates were made and tradeoffs between well cost and increased productivity for some well design options were calculated. Model requirements for predicting aquifer pore clogging were discussed. GRA

N82-33808# Bureau of Mines, Pittsburgh, Pa.
AN EVALUATION OF 3 WET DUST CONTROL TECHNIQUES FOR FACE DRILLS
Steven J. Page Jan. 1982 21 p refs
(PB82-177320; BM-RI-8596; LC-81-607055) Avail: NTIS HC A02/MF A01 CSCL 08I

The comparative effectiveness of three wet dust control techniques for face drilling was determined. Previous attempts to achieve effective dust control on face drills with dry collectors did not meet with success, the largest problem being sustained effective dust capture at the face. The investigation shows that foam and water in small quantities are very effective dust control techniques for face drills when applied through the drill steel at the point of dust generation, and that boom mounted water sprays are only minimally effective for dust conrol on face drills. GRA

N82-33809# Bureau of Mines, Pittsburgh, Pa.
EVALUATION OF THE USE OF FOAM FOR DUST CONTROL ON FACE DRILLS AND CRUSHERS
Steven J. Page Jan. 1982 19 p
(PB82-176215; BM-RI-8595; LC-81-4727) Avail: NTIS HC A02/MF A01 CSCL 08I

The dust suppression technique of applying foam to face drilling and crushing operations in a gypsum mine was investigated because other techniques, such as dry collection and boom mounted external water sprays were not successful. Results for two faces studied show that injection of the foam through the drill steel provided an average dust reduction of 95 pct. However, the use of foam on the crusher provided no dust reduction at the operator's position (because of good local ventilation) and a 27 pct average dust reduction for two feeders at a location midway between the operator's position and the crusher. The conclusions obtained are that foam can be an extremely effective dust control technique when used on localized dust sources such as dust generated within a blasthole during drilling, and foam is only marginally effective as a dust control technique when used on nonlocalized dust sources such as dust generated during the feeder and crusher operation. GRA

N82-33810# Bureau of Mines, Pittsburgh, Pa.
MONITORING OF SUBMICROMETER PARTICLES IN SEALED FIRE AREAS
C. D. Litton, M. Hertzberg, A. L. Furno, and J. M. Kuchta Jan. 1982 26 p refs
(PB82-175951; BM-RI-8586; LC-81-607853) Avail: NTIS HC A03/MF A01 CSCL 08I

Submicrometer particle concentrations and average particle sizes were monitored for four full scale sealed coal fires in the multiple entry section of the Bruceton Experimental Mine. The data from these tests indicate that there exists a very good correlation between the submicrometer particle concentrations and the maximum temperatures measured within the coalbed. As the maximum coalbed temperature decreases with time after sealing the submicrometer particle concentrations show a corresponding reduction. This particle temperature correlation is in sharp contrast to the gas concentration data obtained, for which essentially no

correlation exists with the measured coalbed temperatures. Full scale test results indicate that the measurement of submicrometer particle concentrations may be a more realistic approach to determining the status of underground sealed fire areas. GRA

N82-33811# Institute of Geological Sciences, Edinburgh (Scotland).
WORLD MINERAL STATISTICS 1975-79: PRODUCTION, EXPORTS, IMPORTS
C. D. G. Black, comp., G. J. Lofty, comp., N. E. Sharp, comp., J. A. Hillier, comp., D. C. T. Singh, comp., M. K. Ubbi, comp., R. R. Songra, comp., and A. R. Evans, comp. 1981 268 p
(PB82-172842; ISBN-0-11-884158-0) Copyright. Avail: NTIS HC A12/MF A01 CSCL 08I

Statistical data is presented for individual countries on the production and trade of minerals. GRA

N82-33812# Bituminous Coal Research, Inc., Monroeville, Pa.
FIELD SURVEY OF FLOAT DUST IN COAL MINING OPERATIONS Research Report, Mar. 1980 - Mar. 1981
J. A. Kost, J. F. Colinet, and G. A. Shirey Oct. 1981 163 p
(Contract DI-BM-J0-308030)
(PB82-172719; BM-OFR-17-82) Avail: NTIS HC A08/MF A01 CSCL 08I

The amount, size, and deposition of float coal dust generated during the mining and transporting of coal in underground mining operations were determined. Rock dust distributed by trickle dusters was also sampled. In addition to four belt transfer points, two continuous and two conventional mining sections were sampled at five mines. Float dust samples were collected on deposition pans; total airborne dust was collected with personal samplers equipped with filter casettes; cascade impactors provided relative size distributions of the samples. production, air flow, and water flow were monitored to examine their effect on dust levels. GRA

N82-33813# Geological Survey, Tallahassee, Fla.
EFFECTS OF LAND USE ON SURFACE-WATER QUALITY IN THE EAST EVERGLADES, DADE COUNTY, FLORIDA
Bradley G. Waller Sep. 1982 45 p refs Prepared in cooperation with the Metropolitan Dade County Planning Dept., Miami, Fla.
(PB82-176520; USGS/WRD/WRI-82-005; USGS/WRI-81-59) Avail: NTIS HC A03/MF A01 CSCL 08H

Water quality was determined at five developed areas in the East Everglades, Dade County, Florida, during the 1978 wet season. Data from the developed areas are compared with data from four baseline sites in undeveloped areas to determine the effects of land use on the surface-water quality. Author

N82-33814# Committee for Hydrological Research TNO, The Hague (Netherlands).
EVAPORATION IN RELATION TO HYDROLOGY
1981 91 p refs Proc. of Technical Meeting No. 28, Feb. 1981
(PB82-176108) Copyright. Avail: NTIS HC A05/MF A01 CSCL 08H

The theoretical foundations for the determination of evaporation are balance equations and transport equations. Of the balance equations only the energy balance of the earth's surface is treated. The transport equations are based on the similarity theory of Monin-Obukhov. The concept of a diffusion resistance is introduced in the transport equations. A powerfull method for the determination of evaporation is the combination of the energy balance and the transport equations. In many cases the necessary input data for this method are lacking. Then one can use simplified versions of which those of Priestley-Taylor and Markkink are well-known examples. Evaporation from forests requires a special approach owing to the great aerodynamic roughness of a forest and the large fraction of intercepted precipitation. GRA

N82-33815# Institute of Geological Sciences, Edinburgh (Scotland).
OVERSEAS GEOLOGY AND MINERAL RESOURCES, NUMBER 55. OUTLINE OF THE GEOLOGY OF ECUADOR
J. B. Kennerley 1980 28 p refs
(PB82-172784; ISBN-0-11-884135-1) Copyright. Avail: NTIS HC A03/MF A01 CSCL 08G

The Ecuadorian Andes are composed largely of material of Mesozoic age, which in part rests on older 'basement' rocks. A considerable change in the palaeogeography of the west coast of South America occurred in the area of Ecuador during the Mesozoic. The Guiana Shield, and to a lesser extent other Palaeozoic blocks (including a western 'foreland' of unknown size), were the man sources of sediment until the end of early Cretaceous times. The late Cretaceous saw the development of a major north-south volcanic arc which then dominated the supply of sediment to the marginal basins of the Costa and Sierra. GRA

N82-33816# Institute of Geological Sciences, Edinburgh (Scotland).
OVERSEAS GEOLOGY AND MINERAL RESOURCES, NUMBER 58. AN ANNOTATED BIBLIOGRAPHY OF ECUADORIAN GEOLOGY
C. R. Britow 1981 44 p
(PB82-172768; ISBN-0-11-884140-8) Copyright. Avail: NTIS HC A03/MF A01 CSCL 08G

An annoted bibliography of 991 entries on the geology of ecuador is provided. GRA

N82-33817# Institute of Geological Sciences, Edinburgh (Scotland).
UNITED KINGDOM MINERAL STATISTICS 1980
H. C. Squirrell, comp. 1981 153 p
(PB82-172362; ISBN-0-11-884164-5) Copyright. Avail: NTIS HC A08/MF A01 CSCL 08I

Minerals production, consumption, import and export statistics obtained from a wide variety are presented. The contents were systematically updated by one year. In addition, some headings were introduced in the import and export tables and several modifications made to the commodity summaries section. GRA

N82-33818# Geological Survey, Little Rock, Ark. Water Resources Div.
WATER RESOURCES DATA FOR ARKANSAS, WATER YEAR 1980 Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Oct. 1981 597 p
(PB82-190380; USGS/WRD/HD-81/006; USGS/WDR/AR-80/1) Avail: NTIS HC A25/MF A01 CSCL 08H

Water resources data for the 1980 water year for Arkansas consist of records of stage, discharge, and water quality of streams, as well as stage, contents, and water quality of lakes and reservoirs. Discharge records for 60 gaging stations; stage and contents for four lakes and reservoirs; water quality for 152 stations, 69 partial-record flow stations, eight lakes; and water levels for 79 observation wells are given. Also included are 116 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data collection program, and are published as miscellaneous measurements. Author (GRA)

N82-33819# Geological Survey, Harrisburg, Pa. Water Resources Div.
WATER RESOURCES DATA FOR PENNSYLVANIA, WATER YEAR 1980. VOLUME 1: DELAWARE RIVER BASIN Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Dec. 1981 352 p 3 Vol.
(PB82-190372; USGS/WDR/HD-81/011-Vol-1;
USGS-WDR-PA-80-Vol-1) Avail: NTIS HC A16/MF A01 CSCL 08H

Water resources data for the 1980 water year for Pennsylvania consist of records of discharge and water quality of streams; elevation and contents of lakes and reservoirs; and water levels of ground-water wells. Records for water discharge at 73 gaging stations; elevation and contents at 11 lakes and reservoirs; water quality at 39 gaging stations; and water levels at 16 observation wells are given. Also included are data for 43 crest-stage, 28 low-flow, and 43 water-quality partial-record stations. Additional water data were collected at various sites not involved in the

systematic data-collection program and are published as miscellaneous measurements and analyses. Author (GRA)

N82-33820# Geological Survey, Portland, Oreg. Water Resources Div.
WATER RESOURCES DATA FOR OREGON, WATER YEAR 1980. VOLUME 2: WESTERN OREGON Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Dec. 1981 508 p 2 Vol.
(PB82-190364; USGS/WRD/HD-81/010-Vol-2; USGS-WDR-OR-80-Vol-2) Avail: NTIS HC A22/MF A01 CSCL 08H

Water resources data for the 1980 water year for Oregon consist of records of stage, discharge, and water quality of streams as well as stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. Discharge records for 287 gaging stations; stage only records for 10 gaging stations; stage and contents for 41 lakes and reservoirs; water quality for 98 gaging stations, water levels for 68 obsevations wells; and water quality for 6 precipitation stations are given. Also included are 49 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data collection program, and are published as miscellaneous measurements. Author (GRA)

N82-33821# Geological Survey, Baton Rouge, La. Water Resources Div.
WATER RESOURCES DATA FOR LOUISIANA, WATER YEAR 1981. VOLUME 3: COASTAL LOUISIANA Annual Report, 1 Oct. 1980 - 30 Sep. 1981
Dec. 1981 230 p 3 Vol.
(PB82-188202; USGS/WDR/HD-81/012-Vol-3; USGS-WDR-LA-81-Vol-3) Avail: NTIS HC A11/MF A01 CSCL 08H

Water resources data for the 1981 water year for Louisiana consist of records of stage, discharge, and water quality of streams as well as stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. Records are given for water discharge at 81 gaging stations (including stage for 76 of these stations); stage only for 37 gaging stations and 10 lakes; contents for 1 reservoir; wate quality for 142 surface-water stations (including 35 gaging stations), 27 miscellaneous sites, and 10 lakes, and 286 wells; and water levels for 679 observation wells. Also included are data for 250 crest-stage and flood-profile partial-record stations. Additional water data were collected at various sites not involved in the systematic data-collection program, and are published as miscellaneous measurements. Author (GRA)

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-33822# Resource Planning Associates, Inc., Cambridge, Mass.
THE POTENTIAL FOR INDUSTRIAL COGENERATION DEVELOPMENT BY 1990 Final Report
31 Jul. 1981 158 p refs
(RA-81-1455) Avail: NTIS HC A08/MF A01

The cogeneration study focused on five industries that constitute three quarters of industrial steam demand: pulp and paper, chemicals, petroleum refining, steel, and food processing. These industries use almost one fifth of the total energy consumed in the United States. The analysis reflected the investment and regulatory concerns in the United States. The analysis reflected the investment used by industrial and utility managers. Phone discussions were held with approximately 70 companies to verify and augment the process and energy use data for the five industries. S.L.

N82-33823# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
NICKEL-CADMIUM CELL PERFORMANCE RECOVERY AND RECONDITIONING
Albert H. Zimmerman and Peter K. Effa 1 Sep. 1982 18 p refs
(Contract F04701-81-C-0082)
(SD-TR-82-63; TR-0082(2495-01)-5) Avail: NTIS HC A02/MF A01 CSCL 10C

Recovery of the capacity and voltage and voltage characteristics of sealed NiCd cells by reconditioning after accelerated eclipse season simulation was measured. Performance recovery as a function of reconditioning rate for both shallow and deep discharge conditions, as well as for multiple reconditioning cycles was tested. It is found that low rate reconditioning is most effective for recovery of capacity losses, providing up to 15% capacity improvement. Deep discharge reconditioning is most effective for recovering both capacity and voltage losses, particularly at higher rates. The relative mertis of a range of reconditioning procedures in terms of their usefulness for voltage, capacity, and power improvements are presented. E.A.K.

N82-33824*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
USE OF THE CHARGE/DISCHARGE (C/D) RATIO TO AUMENT VOLTAGE LIMIT (V SUB T) CHARGE CONTROL IN THE ERBS SPACECRAFT
Gerald Halpert 8 Jul. 1982 44 p
(NASA-TM-83991; G82-0023-7; NAS 1.15:83991) Avail: NTIS HC A03/MF A01 CSCL 10C

A 50-ampere hour nickel cadmium cell test pack was operated in a power profile simulating the orbit of the Earth Radiation Budget Satellite (ERBS). The objective was to determine the ability of the temperature compensated voltage limit (V sub T) charge control system to maintain energy balance in the half sine wave-type current profile expected of this mission. The four-cell pack (50 E) was tested at the Naval Weapons Support Center (NWSC) at Crane, Indiana. The ERBS evaluation test consisted of two distinct operating sequences, each having a specific purpose. The first phase was a parametric test involving the effect of V sub T level, temperature, and Beta angle on the charge/discharge (C/D) ratio, an indicator of the amount of overcharge. The second phase of testing made use of the C/D ratio limit to augment the V sub T charge limit control. When the C/D limit was reached, the current was switched from the taper mode to a C/67 (0.75 A) trickle charge. The use of an ampere hour integrator limiting the overcharge to a C/67 rate provided a fine tuning of the charge control technique which eliminated the sensitivity problems noted in the initial operating sequence. Author

N82-33825*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NECAP 4.1: NASA'S ENERGY COST ANALYSIS PROGRAM ENGINEERING MANUAL
Ronald N. Jensen May 1982 430 p refs
(NASA-TM-83240; NAS 1.15:83240) Avail: NTIS HC A19/MF A01 CSCL 10A

The detailed procedure and algorithms used by the NASA Energy-Cost Analysis Program (NECAP) for determining and minimizing building energy consumption are provided. Author

N82-33826*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NECAP 4.1: NASA'S ENERGY COST ANALYSIS PROGRAM ENGINEERING FLOW CHART
Ronald N. Jensen May 1982 166 p refs
(NASA-TM-83242; NAS 1.15:83242) Avail: NTIS

HC A08/MF A01 CSCL 10A

Flow charts for one NASA Energy-Cost Analysis Program (NECAP) to determine and to minimize building energy consumption are provided. Author

N82-33827*# Solar Turbines International, San Diego, Calif.
LOW NOx HEAVY FUEL COMBUSTOR CONCEPT PROGRAM Final Report
David J. White, Richard T. LeCren, and Anthony P. BatAkis Nov. 1981 93 p refs
(Contracts DEN3-145; DE-AI01-77ET-13111)
(NASA-CR-165481; DOE/NASA/0145-1; NAS 1.26:165481; SR81-R-4761-21) Avail: NTIS HC A05/MF A01 CSCL 10B

A total of twelve low NOx combustor configurations, embodying three different combustion concepts, were designed and fabricated as modular units. These configurations were evaluated experimentally for exhaust emission levels and for mechanical integrity. Emissions data were obtained in depth on two of the configurations. R.J.F.

N82-33828# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN DESCRIPTION OF THE TANGAYE VILLAGE PHOTOVOLTAIC POWER SYSTEM
James E. Martz and Anthony F. Ratajczak Jun. 1982 113 p refs
(NASA-TM-82917; E-1305; NAS 1.15:82917) Avail: NTIS HC A06/MF A01 CSCL 10A

The engineering design of a stand alone photovoltaic (PV) powered grain mill and water pump for the village of Tangaye, Upper Volta is described. The socioeconomic effects of reducing the time required by women in rural areas for drawing water and grinding grain were studied. The suitability of photovoltaic technology for use in rural areas by people of limited technical training was demonstrated. The PV system consists of a 1.8-kW (peak) solar cell array, 540 ampere hours of battery storage, instrumentation, automatic controls, and a data collection and storage system. The PV system is situated near an improved village well and supplies d.c. power to a grain mill and a water pump. The array is located in a fenced area and the mill, battery, instruments, controls, and data system are in a mill building. A water storage tank is located near the well. The system employs automatic controls which provide battery charge regulation and system over and under voltage protection. This report includes descriptions of the engineering design of the system and of the load that it serves; a discussion of PV array and battery sizing methodology; descriptions of the mechanical and electrical designs including the array, battery, controls, and instrumentation; and a discussion of the safety features. The system became operational on March 1, 1979. Author

N82-33829*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ON THE ROAD PERFORMANCE TESTS OF ELECTRIC TEST VEHICLE FOR CORRELATION WITH ROAD LOAD SIMULATOR Final Report
Miles O. Dustin and Ralph J. Slavik Aug. 1982 27 p refs
(Contract DE-AI01-77CS-51044)
(NASA-TM-82900; E-1283; DOE/NASA/51044-25; NAS 1.15:82900) Avail: NTIS HC A03/MF A01 CSCL 13F

A dynamometer (road load simulator) is used to test and evaluate electric vehicle propulsion systems. To improve correlation between system tests on the road load simulator and on the road, similar performance tests are conducted using the same vehicle. The results of track tests on the electric propulsion system test vehicle are described. The tests include range at constant speeds and over SAE J227a driving cycles, maximum accelerations, maximum gradability, and tire rolling resistance determination. Road power requirements and energy consumption were also determined from coast down tests. S.L.

N82-33830*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THEORETICAL AND EXPERIMENTAL POWER FROM LARGE HORIZONTAL-AXIS WIND TURBINES
Larry A. Viterna and David C. Janetzke Sep. 1982 21 p refs Presented at the 5th Biennial Conf. and Workshop on Wind Energy, Washington D.C., 5-7 Oct. 1981
(Contract DE-AI01-76ET-20320)
(NASA-TM-82944; E-1346; DOE/NASA/20320-41; NAS 1.15:82944) Avail: NTIS HC A02/MF A01 CSCL 10A

A method for calculating the output power from large horizontal-axis wind turbines is presented. Modifications to the airfoil characteristics and the momentum portion of classical blade element-momentum theory are given that improve correlation with measured data. Improvement is particularly evident at low tip-speed ratios where aerodynamic stall can occur as the blade experiences high angles of attack. Output power calculated using the modified theory is compared with measured data for several large wind turbines. These wind turbines range in size from the DOE/NASA 100 kW Mod-0 (38 m rotor diameter) to the 2000 kW Mod-1 (61 m rotor diameter). The calculated results are in good agreement with measured data from these machines. Author

N82-33831# Eagle-Picher Industries, Inc., Joplin, Mo.
CALCIUM INORGANIC ELECTROLYTE BATTERY DEVELOPMENT Final Report, Apr. - Oct. 1981
Dennis Carr, Edward Heaton, and Bob Higgins Wright-Patterson AFB, Ohio AFWAL Mar. 1982 78 p
(Contract F33615-77-C-2020; AF Proj. 3145)
(AD-A115956; AFWAL-TR-82-2013) Avail: NTIS HC A05/MF A01 CSCL 10/3

Eighteen 2000 ampere hour and eight 200 ampere hour calcium thionyl chloride cells of a low surface area design were fabricated and performance tested. The tests covered: (1) electrolyte volume optimization; (2) characterization of discharge capacity vs. rate and temperature; (3) intermittent discharging characterization; and (4) reversed polarity abuse. Author (GRA)

N82-33832# Eagle-Picher Industries, Inc., Joplin, Mo.
NICKEL-ZINC BATTERIES FOR RPV APPLICATIONS Final Technical Report, 15 Nov. 1979 - 15 Aug. 1981
Donna Dappert Wright-Patterson AFB, Ohio AFWAL Feb. 1982 161 p
(Contract F33615-78-C-2058; AF Proj. 3145)
(AD-A115843; AFWAL-TR-82-2003) Avail: NTIS HC A08/MF A01 CSCL 10/3

Final technical results are presented for a program dealing with the placement of nickel-zinc batteries in specific military applications, namely the BQM-34A and the PQM-102 Remotely Piloted Vehicles (RPV's). The nickel-zinc system was selected for these applications because RPV's demand a high quality secondary battery that offers a compromise between long life (calendar and cycle) and low weight and volume. GRA

N82-33833# Army Electronics Technology and Devices Lab., Fort Monmouth, N. J.
HIGH ENERGY SURFURYL CHLORIDE BATTERIES
Sol Gilman, William Wade, Jr., and Michael Binder 18 Jun. 1982 11 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117106) Avail: NTIS HC A02/MF A01 CSCL 10/3

There is no practical alternative to the use of primary batteries to power man portable electronic equipment for communications, surveillance, target acquisition, and night vision applications. For an increasing percentage of such newly developed equipments, power and energy density requirements are so high that only the most energetic electrochemical couples can be considered for the purpose. Cells utilizing sulfuryl chloride as the cathode reactant are the latest and most energetic of the liquid cathode cells resulting from research initiated at the Electronics Technology and Devices Laboratory in the early 1970s. GRA

N82-33834# Army Electronics Technology and Devices Lab., Fort Monmouth, N. J.
PROPERTIES OF SOC12 ELECTROLYTE SOLUTIONS
Mark Salomon 18 Jun. 1982 10 p refs Presented at the Army

Sci. Conf., 15-18 Jun. 1982
(AD-A117306) Avail: NTIS HC A02/MF A01 CSCL 10/3

A number of types of lithium secondary and primary non-aqueous batteries are under development in the power sources division at Fort Monmouth. Military applications for portable power sources range from communications to laser designators and night vision devices. For the latter two applications, the lithium-thionyl chloride battery has been identified as a highly promising system. The battery was initially shown to be capable of providing very high energy densities at various rates of discharge. Since there are virtually no detailed studies on the general physical chemistry of electrolyte solutions in SOC12, the initial phase of the program to develop new electrolytes was to determine those factors which govern both conductivities and solubilities. GRA

N82-33835# Ultrasystems, Inc., Fairfax, Va.
ADVANCED BIO-ENERGY SYSTEMS FOR AIR FORCE INSTALLATIONS Final Report, Feb. 1980 - Jan. 1981
William J. Huff and Desmond H. Bond Oct. 1981 100 p refs
(Contract DACA31-80-D-0020; AF Proj. 2054)
(AD-A117084; FESA-T-2110; AFESC/ESL-TR-81-11) Avail: NTIS HC A05/MF A01 CSCL 01/1

This investigation was sponsored by the US Air Force to determine the potential of using innovative biomass energy conversion technology interface with in place energy generating hardware to sustain total annual facility energy requirements on a forested airbase. The investigation found that Eglin AFB, FL, has high potential for such a system, but that certain components and subsystems require test, evaluation and demonstration in an Air Force base environment before full implementation is possible. The investigation found that a biomass energy island system could be achieved through a centralized biomass gasification/combined cycle system to produce 135,000 1b/hr 150 psig steam (saturated) and 27 Mwh/hr electrical power from 1480 green tons of wood chips daily. A phased implementation system is recommended, consisting of separate integrable test and evaluation modules for combined cycle wood gasification and for cogeneration, which would dovetail into an expanded basewide energy self sufficient system. The investigation did not consider harvestation of base woodlands, which is the subject of a separate effort to define the wood resource aspects of a total biomass self-sufficient system. Author (GRA)

N82-33836# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
SHORT-CIRCUIT FORMATION DURING NiCd CELL REVERSAL
Albert H. Zimmerman and Peter K. Effa 20 May 1982 29 p refs
(Contract F04701-81-C-0082)
(AD-A117912; TR-0082(2945-01)-2; SD-TR-82-26) Avail: NTIS HC A03/MF A01 CSCL 10/3

The reduction of Cd(OH)2 to cadmium at the nickel electrode in the NiCd cell has been found to compete with the hydrogen evolution reaction during cell reversal. This reduction reaction can lead to internal short circuits as cadmium dendrites bridge the separator. The cadmium metal short circuits are reoxidized when the cell is recharged and do not appear to have a significant short-term effect on cell performance. Author (GRA)

N82-33837# Geo-Centers, Inc., Newton, Mass.
COMPATIBILITY OF POLYACETYLENE WITH LITHIUM BATTERY MATERIALS
Jul. 1982 6 p refs
(Contract N00014-82-C-2124)
(AD-A117684; GC-TR-82-288) Avail: NTIS HC A02/MF A01 CSCL 10/3

The object of the research conducted under this contract is to evaluate polyacetylene (CHx) as a replacement for carbon as the cathode material in primary lithium/thionyl chloride (Li/SOCl2) and lithium/sulfur dioxide (Li/SO2) batteries. The choice of the Li/SOCl2 inorganic electrolyte cell is based on the fact that it is the highest energy density system known to date. By itself, the favorable ratio of obtainable work to weight is not sufficient. For Navy applications, the rate at which the cell supplies energy, the power density, is very important. CHx is a lightweight material with extremely high effective surface area (60 m squared/g) and good electrical conductivity when doped, thus making it a good candidate for an electrode in a high power density cell. GRA

N82-33838# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
DEVELOPMENT OF A DIRECT-ABSORPTION HIGH-TEMPERATURE GAS RECEIVER
Arlon J. Hunt Aug. 1981 7 p refs Presented at the Intern. Solar Energy Soc. Congr., Brighton, England, 23-28 Aug. 1981
(Contract W-7405-eng-48)
(DE82-010168; LBL-13234; CONF-810865-12) Avail: NTIS HC A02/MF A01

The development of a high temperature solar thermal gas receiver using direct absorption of concentrated sunlight by a suspension of small carbon particles is described. The small particle heat exchange receiver (SPHER) can be used to power a Brayton cycle engine, supply industrial process heat or heat a gas to provide energy for a chemical reaction. The advantages are: simplicity, low pressure loss, light weight, and high optical efficiency. The experimental and theoretical progress in the design of a 30 kW thermal test receiver is discussed. DOE

N82-33839# Little (Arthur D.), Inc., Cambridge, Mass.
RESIDUAL ENERGY APPLICATION PROGRAM: UTILIZATION OF HIGH-TEMPERATURE WASTE HEAT BY MEANS OF RANKINE-CYCLE ENGINES. A TECHNICAL SUMMARY Final Report
Oct. 1981 49 p
(Contract DE-AC05-79ET-60035)
(DE82-010376; DOE/ET-60035/T3; ADL-36011) Avail: NTIS HC A03/MF A01

High temperature residual or waste heat which is directly discharged by industries and utilities in the form of exhaust gases and which can be converted to useful energy through the use of Rankine bottoming cycle (RBC) engines is discussed. The potential markets for RCB's in industrial processing, the gas pipeline industry, and municipal and public utilities are discussed. The potential oil savings and foreseeable factors that can affect RCB market penetration in these industris are summarized. The operating principles and system efficiency of a Rankine cycle system are discussed. In selecting a Rankine engine for a given application, consideration must be given to the thermodynamic properties and thermal stability of its working fluid as well as to the fluid's safety properties. DOE

N82-33840# Rocket Research Corp., Redmond, Wash.
DEVELOPMENT OF A LONG-LIFE HIGH-TEMPERATURE CATALYST FOR THE SO2/SO3 ENERGY-STORAGE SYSTEM Final Report
E. W. Schmidt, D. J. Day, G. S. Fairfull, D. H. Gates, C. H. Li, and D. R. Poole Mar. 1982 134 p refs
(Contract DE-AC04-76DP-00789)
(DE82-009723; SAND-81-8182; RRC-80-R-697) Avail: NTIS HC A07/MF A01

Fifty new catalysts using 21 different active metals and a wide variety of catalyst carriers and preparation methods were tested for activity in SO/sub x/ reactions using differential isothermal reactors and pulsed microreactors. The most active catalyst, a 1% platinum on a lumina catalyst, was subjected to a 6 month accelerated life test at 11440 K (16000 F). The main degradation mechanism was identified as loss of carrier surface area by sintering and platinum active metal by volatilization. The temperature to which the catalyst was exposed during the life test was increased to 11440 K to accelerate aging phenomena and to demonstrate margin. Activity remaning after 6 months at 11440 K was approximately half of that of fresh catalyst. A kinetic rate equation for the decomposition of undiluted SO3 on a Pt catalyst at 10005 to 11350 K was derived from experimental data. A computer model was developed for the sizing of SO3 decomposition reactors based on desired conversion and 10 other input variables. DOE

N82-33841# Copenhagen Univ. (Denmark). Lab. for Physics.
OPTIMAL STAGING OF ENDOREVERSIBLE HEAT ENGINES
Morton H. Rubin (Maryland Univ. Baltimore County) and Bjarne Andresen 1980 25 p refs
(DE82-900742; KU-HCOE-FL2-R-80-10) Avail: NTIS (US Sales Only) HC A02/MF A01;DOE Depository Libraries

Two endoversible engines were put in series to form a single engine, whose power output is maximized. The interface between the two stages, which for the present model is the intermediate temperature and the relative timing of the two engines, is arbitrary and can be used to satisfy other, nonthermodynamic constraints. Adding any constraint on the volume of the working gas does not lift this indeterminacy. The optimum composite system is equivalent to a single endoreversible engine. DOE

N82-33842# Westinghouse Research and Development Center, Pittsburgh, Pa.
DEVELOPMENT OF COPPER SULFIDE/CADMIUM SULFIDE THIN-FILM SOLAR CELLS
J. R. Szedon, W. J. Biter, and H. C. Dickey Mar. 1982 52 p refs
(Contract DE-AC02-77CH-00178)
(DE82-009398; SERI/PR-8143-1-T6) Avail: NTIS HC A04/MF A01

Unencapsulated thin film solar cells of the Cu2S/CdS type were aged in controlled flowing gas ambients to characterize changes in their photovoltaic properties. Severe degradation which occurs in wet O2 ambients at room temperature may account for the large short circuit current losses reported earlier. Limited loss in J/sub sc/ occurs at RT in dry oxygen. No loss is attributed to moisture in Ar or N2 ambients for exposure times greater than approx. 2 hrs. Direct measurements of optical absorption in the front Cu2S layer facilitated by an intergral CdS/Cu2S detector on the back surface. Several techniques for making such a detector are demonstrated. GRA

N82-33843# Woods Hole Oceanographic Institution, Mass.
BIOMASS PRODUCTION, ANAEROBIC DIGESTION, AND NUTRIENT RECYCLING OF SMALL BENTHIC OR FLOATING SEAWEEDS
John H. Ryther Feb. 1982 45 p
(Contracts DE-AC02-77CH-00178; EY-76-S-02-2948)
(DE82-009172; SERI/TR-98133-1B) Avail: NTIS HC A03/MF A01

The development of a seaweed based ocean energy farm was studied. Forty two species of seaweed indigenous to the coastal waters of Central Florida were screened for high biomass yields in intensive culture. Yield varies inversely with seawater exchange rate, apparently because of carbon dioxide limitation at low exchange rates. The suitability of digester residue as a nutrient source for growing Gracilaria was studied. Nitrogen recycling efficiency from harvested plant through liquid digestion residue to harvested plant approaches 75%. It is shown that nutrient uptake and storage by Grailaria, Ascophyllum, and Sargassum on nutrient starved plants are capable of rapidly assimilating and storing inorganic nutrients which may be used later for growth when no nutrients are present in the medium. A shallow water seaweed farm is proposed which can produce methane from harvested seaweed and use digester residues as a concentrated source of nutrients for periodic fertilizations. DOE

N82-33844# Southern Solar Energy Center Planning Project, Atlanta, Ga.
SOLAR-HEATED MUNICIPAL SWIMMING POOLS, A CASE STUDY: DADE COUNTY, FLORIDA
Mike Levin Sep. 1981 11 p refs
(Contract DE-AC02-79CS-30166)
(DE82-009475; SSEC/SP-32266) Avail: NTIS HC A02/MF A01

The installation of a solar energy system to heat the water in the swimming pool in one of Dade County, Florida's major parks is described. The mechanics of solar heated swimming pools are explained. The solar heating system consists of 216 unglazed polypropylene tube collectors, a differential thermostat, and the distribution system. The systems performance and economics as well as future plants are discussed. DOE

N82-33845# Institute of Public Administration, Washington, D.C.
AN ASSESSMENT OF THE FIELD STATUS OF ACTIVE SOLAR SYSTEMS
Feb. 1982 87 p
(Contract DE-AC03-80SF-11485)
(DE82-011939; DOE/SF-11485/1) Avail: NTIS HC A05/MF A01

Findings and recommendations by experts from basic data gathered through first hand interviews with over 150 solar industry people in various parts of the country are assessed. Domestic hot water systems are emphasized. The following topics are included: industry description, product problems and marketing. DOE

N82-33846# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. VOLUME 6: NEWMAN POWER STATION, EL PASO, TEXAS
Jan. 1982 11 p
(Contract DE-AC04-76DP-00789)
(DE82-008483; SAND-81-7100-6) Avail: NTIS HC A02/MF A01

Performance data for the month of December 1981 for a 20 kW peak photovoltaic flat panel power system for an uninterruptable power supply load at an El Paso, Texas utility ae given. Data include monthly total and daily insolation, monthly total and daily electrical energy, and array efficiency. Also plotted are the data acquisition mode and recording intervals for each day of the month. Three site events (maintenance and system problems) are summarized, and missing data from December 25 through December 30 are explained. DOE

N82-33847# FWG Associates, Inc., Tullahoma, Tenn.
GUIDELINES FOR SITING WECS RELATIVE TO SMALL-SCALE TERRAIN FEATURES Final Report
Walter Frost and Chih-Fang Shieh Dec. 1981 215 p refs
(Contracts DE-AC06-76ET-20242; EY-76-C-06-2443)
(DE82-009124; DOE/ET-20242/78-1) Avail: NTIS HC A10/MF A01

Guidelines for siting wind energy conversion systems (WECS) relative to small-scale terrain features are presented to assess the influence of small or microscale terrain features on a proposed wind turbine site. Three categories of terrain were considered: (1) protrusions, topographical features that protrude well above the general level of their neighboring terrain; (2) depressions, valleys, canyons, or passes; and (3) complex terrain, so rugged or irregular that no well defined protrusion or depression can be easily distinguished. The optimum site on a protrusion is always at the highest point. The smoother the peak of the protrusion and the more gentle the slopes on all sides the more optimum the site, providing the geometry and orientation of the depression are such that full advantage can be taken of existing strong valley winds or outflow. Where the terrain is very complex and tortuous, the highest point of the topography will be the optimum site. DOE

N82-33848# Los Alamos Scientific Lab., N. Mex.
SUPERCONDUCTING MAGNETIC ENERGY STORAGE (SMES) PROGRAM Progress Report, 1 Jan. - 31 Dec. 1981
John D. Rogers, comp. Feb. 1982 32 p refs
(Contract W-7405-eng-36)
(DE82-009083; LA-9208-PR) Avail: NTIS HC A03/MF A01

A 30 MJ superconducting magnetic energy storage (SMES) unit to stabilize power oscillations was developed. The 30 MJ superconducting coil manufacture is completed and the design of the seismic mounting of the coil to the nonconducting dewar lid and a concrete foundation is complete. An economic and technological evaluation of superconducting fault current limiter (SFCL) was completed and the results are reported. DOE

N82-33849# Oak Ridge National Lab., Tenn. Engineering Technology Div.
STIRLING ENGINE WITH ONE ADIABATIC CYLINDER

C. D. West Mar. 1982 57 p refs
(Contract W-7405-eng-26)
(DE82-009606; ORNL/TM-8022) Avail: NTIS HC A04/MF A01

It is shown that integration around the P-V loop of a Stirling-like cycle with an adiabatic expansion or compression space is possible through careful application of the ideal gas laws. The result is a set of closed-form solutions or the work output, work input, and efficiency for ideal gases. Previous analyses yielded closed-form solutions only for machines in which all spaces behave isothermally, or that have other limitations that simplify the arithmetic but omit important aspects of real machines. The results of this analysis, although still far removed from the exact behavior of real, practical engines, yield important insights into the effects observed in computer models and experimental machines. These results are especially illuminating for machines intended to operate with fairly small temperature differences. Heat pumps and low-technology solar-powered engines might be included in this category. DOE

N82-33850# City of Columbia, Mo.
DEVELOPMENT OF A WASTE-TO-ENERGY PLAN: CITY OF COLUMBIA, MISSOURI
Feb. 1982 93 p
(Contract DE-FG01-79CS-20239)
(DE82-009288; DOE/CS-20239/1) Avail: NTIS HC A05/MF A01

The development of a practical plan whereby energy can be recovered from the solid wastes generated in the Columbia, Missouri area is discussed. This plan proceeds only to the point at which the City of Columbia and the University of Missouri can determine their most appropriate course of action. The approaches explored in the development of the plan include: use of shredded solid waste in the existing stoker-fired boilers and use of unprocessed solid waste as fuel in modular burning units equipped with waste heat boilers for the production of steam. This approach would be applicable to the University of Missouri system, which has the potential capability of utilizing all of the steam which could be produced from the available waste and also would potentially be applicable for local industrial uses. The other approach is the use of the gases of combustion from the primary chambers of modular burning units for direct injection into the furnace of an existing gas-fired municipal boiler. This approach was extended to include coal-fired boilers as well. A general assessment of hazardous wastes generated in the community was done. DOE

N82-33851# Acres American, Inc., Buffalo, N.Y.
INTEGRATED ENVIRONMENTAL AND SAFETY ASSESSMENT OF SELECTED MECHANICAL ENERGY STORAGE SYSTEMS Final Report
Jan. 1982 315 p refs Prepared in cooperation with Nuclear Utility Services, Inc., Rockville, Md.
(EPRI Proj. 1317-2)
(DE82-902073; EPRI-EA-2231) Avail: NTIS HC A14/MF A01

The environmental, safety, and social impacts of two mechanical storage systems, underground pumped hydro (UPH) and compressed air energy storage (CAES) are similar to those of existing peaking power plants. These impacts, with engineering factors, form a methodology for selecting sites for these two systems. Application of this methodology to a hypothetical case indicates that, although design alternatives which mitigate adverse environmental impacts are recommended, site selection effectively limits the environmental effect of CAES or UPH plants. Public perception of CAES and UPH energy storage facilities should generally be positive, provided that those affected are informed and allowed to participate in the siting process. DOE

N82-33852# California Univ., Berkeley. Energy and Environment Div.
TECHNOLOGY ASSESSMENT OF SOLAR-ENERGY SYSTEMS. PART 1: AN ANALYSIS OF LIFE-CYCLE COSTS OF SOLAR FACILITIES. PART 2: MINERALS CRITICAL TO THE DEVELOPMENT OF FUTURE ENERGY TECHNOLOGIES IN HIGH AND LOW SOLAR SCENARIOS
Jayant Sathaye and Henry Ruderman Sep. 1981 49 p refs
(Contract DE-AC03-76SF-00098)
(DE82-012339; LBL-13324) Avail: NTIS HC A03/MF A01

Solar and renewable technologies account for most of the increase in material requirements for energy technologies. The analysis identified 20 minerals where domestic reserves are inadequate to meet the demand. Domestic mine capacity is inadequate for 23 minerals. However, the world wide mine production capacity is adequate to meet the US demand for all the minerals. Energy related demand can therefore provide a potential market for some of these 23 minerals provided the US has deposits that can be exploited at worldwide competitive prices. For some critical and strategic minerals such as chromium the US demand peaks during a time period different than the period during which world demand peaks. The time period differences will help smooth market fluctuations and reduce the US vulnerability. Alternative technology designs can help mitigate diverse supply disruptions or sharp price increases. Alternatives may not always be available for a specific strategic and critical mineral. Each mineral may have to be analyzed and evaluated on its own merits before comparative options can be completely analyzed. DOE

N82-33853# Southern Solar Energy Center Planning Project, Atlanta, Ga.
RESIDENTIAL HEATING AND COOLING LOADS AND COSTS FOR THE SOUTH
Andrew S. Lau and Ted D. Hyatt Jan. 1982 29 p refs
(Contract DE-AC02-79CS-30166)
(DE82-009504; SSEC/TP-41300) Avail: NTIS HC A03/MF A01

Typical residential heating and cooling loads for 24 southern cities and six other US cities were analyzed. A 1536-square-foot house was examined, with concrete slab floor, frame construction, ventilated attic, and glazing area equivalent to 12% of the floor area. Five basic variations of this house were analyzed: two insulation levels with two compass orientations each, and a Sun-tempered case. The building load calculations were based on a non-rigorous methodology typically used within the building community today. The estimated heating and cooling loads and the impact of insulation, orientation, and sun-tempering are illustrated with regional maps. Typical fuel costs and heating systems are also examined and shown to have a major role in determining whether the building design emphasis should be on heating or cooling. DOE

N82-33854# Grumman Aerospace Corp., Bethpage, N.Y.
PRELIMINARY DESIGN AND ECONOMIC INVESTIGATIONS OF DIFFUSER AUGMENTED WIND TUBINES (DAWT) Final Report, 15 May 1979 - 31 Mar. 1980
K. M. Foreman Dec. 1981 249 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-008475; SERI/TR-98073-1B) Avail: NTIS HC A11/MF A01

A preferred design and configuration approach for the diffuser augmented wind turbines (DAWT) innovative wind energy conversion system is proposed. A preliminary economic assessment for limited production rates of units between 5 and 150 kw rated output was made. It is estimated that for farm and REA cooperative end users, the COE can range between 2 and 3.5 cents/kWh for sites with annual average wind speeds of 16 and 12 mph respectivelyl and 150 kW rated units. No tax credits are included in these COE figures. For commercial end users of these 150 kW units the COE ranges between 4.0 and 6.5 cents/kWh for 16 and 12 mph sites. These estimates in 1979 dollars are lower than DOE goals set in 1978 for the rating size and end applications. DOE

N82-33855# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
DESIGN OF THE GLENWOOD SPRINGS DOWNHOLE HEAT EXCHANGER
Peter Chiu Apr. 1982 24 p refs
(Contract DE-AC07-76ID-01570)
(DE82-013809; EGG-GTH-5812) Avail: NTIS HC A02/MF A01

A heat exchanger has been designed to obtain 250,000 Btu/hr from a 20 in. diameter geothermal well at various brine tempera-

tures. The system consists of a 10 in. diameter plastic pipe to promote convective flow in the well and a 4 in. diameter, Schedule 40 steel U-tube containing distilled water to extract the energy. Subject to the validity of the major assumptions, the required lengths of one leg of the U-tube at various brine temperatures are 34 ft (1500 F), 42 ft (1400 F), 54 ft (1300 F), and 75 ft (1200 F) for a mean working fluid temperature of 900 F. DOE

N82-33856# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
GEOTHERMAL CONVERSION AT VETERANS HOSPITAL, BOISE, IDAHO
Ivar A. Engen and Stephen W. Metzger Feb. 1982 17 p
(Contract DE-Ac07-76ID-01570)
(DE82-012198; EGG-GTH-5573) Avail: NTIS HC A02/MF A01

A geothermal resource near the Veterans Administration Hospital facilities in Boise, Idaho, has been used since the turn of the century for space heating of homes. A plan for using this resource in some of the Veterans Hospital facilities is discussed. Preliminary cost estimates are presented, economic evaluation criteria are given, and heating system alternatives for the facilities are compared. DOE

N82-33857# Oak Ridge National Lab., Tenn. Engineering Technology Div.
ENERGY STORAGE USING PHASE-CHANGE MATERIALS FOR ACTIVE SOLAR HEATING AND COOLING: AN EVALUATION OF FUTURE RESEARCH AND DEVELOPMENT DIRECTION
R. J. Borkowski, T. K. Stovall, R. J. Kedl, and J. J. Tomlinson Apr. 1982 38 p refs
(Contract W-7405-eng-26)
(DE82-014656; ORNL/TM-8098) Avail: NTIS HC A03/MF A01

The current state of the art and commercial potential of active solar heating and cooling systems for buildings, and the use of thermal energy storage with these systems are assessed. The need for advanced latent heat storage subsystems in these applications and priorities for their development are determined. Latent storage subsystems are advantageous in applications where their compactness may be exploited. It is suggested that subsystems could facilitate storage in retrofit applicatins in which storage would be physically impossible otherwise. DOE

N82-33858# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. VOLUME 8: NEWMAN POWER STATION, EL PASO, TEXAS Executive Summary
Mar. 1982 9 p
(Contract DE-AC04-76DP-00789)
(DE82-014247; SAND-81-7100/8) Avail: NTIS HC A02/MF A01

Performance data for 20 kWp photovoltaic flat panel power system for an uninterruptable power supply load (computer) are summarized. Data given include: (1) daily and monthly electrical energy produced; (2) daily and monthly incident solar energy; (3) array efficiency; (4) capacity factor; and (5) the data acquisition mode and recording interval plot. DOE

N82-33859# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
HOMEOSTATIC CONTROL: ECONOMIC INTEGRATION OF SOLAR TECHNOLOGIES INTO ELECTRIC POWER OPERATIONS AND PLANNING
Richard D. Tabors Jul. 1981 25 p refs
(Contract DE-AM01-76EI-02295)
(DE82-013631; MIT-EL-81-028) Avail: NTIS HC A02/MF A01

The economic issues associated with the interface of new energy technologies and the electric utility grid are discussed. The concept of homestatic control is introduced and the use of such an economic concept applied to the introduction of nondispatchable technologies into the existing utility system is examined. The transition and potential impact of a homeostatic control system working with the existing electric utility system is treated. DOE

N82-33860# Synergistic Design and Engineering, Minneapolis, Minn.
HOME RETROFITTING FOR ENERGY CONSERVATION AND SOLAR CONSIDERATIONS
Oct. 1981 98 p refs Prepared for the Mid-American Solar Energy Complex, Minneapolis
(Contract DE-AC02-79CS-30150)
(DE82-013420; MASEC-SCR-81-091) Avail: NTIS HC A05/MF A01

A manual which explains both the key concepts behind the need for and the home energy efficiency improvement is reviewed. A comprehensive picture of how home energy use is effected by the inhabitants and by the structure itself is presented. The manual explains: looking at energy, how the heat transfer occurs between houses and humans, energy audits and how to use them, energy conservation actions to do now to reduce energy use. Schemes to reduce infiltration, how to increase insulation, and what to do with windows and doors, heating and heat distribution systems, and water heaters are included. Solar energy options are explained, as well as financing and tax credits. DOE

N82-33861# Boeing Aerospace Co., Seattle, Wash.
HIGH-ASPECT-RATIO SILICON-CELL METALLIZATION Final Technical Status Report
Jan. 1982 42 p
(Contract DE-AC04-76DP-00789)
(DE82-011687; SAND-81-7033) Avail: NTIS HC A03/MF A01

Two features of the silicon concentrator solar cell are addressed which affect output at high concentration levels. The first is the development of narrow but high electroplated grid lines with improved conductivity. The object is a reduction in cell series resistance without increase in shadowing. This goal is accomplished by electroplating through a thick photo resist mask to produce lines .7 mil wide by .7 mil high. Advance pulse plating techniques are combined with pure silver plating baths to produce a deposit conductivity equal to the bulk silver conductivity. The second feature is a double diffused selectivity textured front surface. This development employs a deep diffusion in the silicon under the grid lines. Only the non-grid line open area is selectively texture etched, removing the deep junction. This open textured area is then given a second shallow diffusion for optimum cell efficiency. This selective procedure maintains the original highly polished wafer surface under the grid lines so that high resolution narrow grid lines are possible. DOE

N82-33862# Stanford Univ., Calif. Petroleum Research Inst.
PRELIMINARY STUDY OF IN-SITU COMBUSTION IN DIATOMITES
Mohammad R. Fassihi, Sidqi Abu-Khamsin, William E. Brigham, Laurie A. Williams, and Stephen A. Graham Mar. 1982 36 p refs
(Contract DE-AC03-76ET-12056)
(DE82-013272; DOE/ET-12056/32; SUPRI-TR-32) Avail: NTIS HC A03/MF A01

The feasibility of applying in-situ combustion techniques to diatomaceous reservoirs, was examined for a section of core taken in the south plunge of the anticline in the Lost Hills field of the San Joaquin Valley in California was examined. A fast steam plateau, good oxygen utilization, and an unusual front were observed. Fingering caused formation of a second front downstream. This finger stabilized and later became very hot (16000 F). Velocity of front movement through the core almost doubled after the two fronts joined. The cores were compared before and after combustion by scanning microscopy, power X-ray diffraction, and extraction techniques. After burning, the sediments changed from dark brown to red in color. Small numbers of diatom frustules were transformed from amorphous opal to quartz, with accompanying occlusion of pore spaces. With the exception of the color change, however, the sediments remained largely unaltered. DOE

N82-33863# Los Alamos Scientific Lab., N. Mex.
HOT-DRY-ROCK GEOTHERMAL RESOURCE 1980

Grant Heiken, ed., Fraser Goff, ed., and Glenda Cremer, ed. Apr. 1980 116 p refs
(Contract W-7405-eng-36)
(DE82-015082; LA-9295-HDE) Avail: NTIS HC A06/MF A01

The work performed on hot dry rock (HDR) geothermal resource evaluation, site characterization, and geophysical exploration techniques is summarized. The work was done by region (Far West, Pacific Northwest, Southwest, Rocky Mountain States, Midcontinent, and Eastern) and limited to the conterminous US. DOE

N82-33864# Electric Power Research Inst., Palo Alto, Calif. Residential and Commercial Applications Program.
SOLAR-HEATING AND -COOLING RESEARCH PROJECTS: A SUMMARY
N. Lansing Feb. 1982 50 p
(DE82-903152; EPRI-EM-2272-SR) Avail: NTIS HC A03/MF A01

In addition to outlining solar heating and cooling experimental projects, the major features of the solar systems are described. Also included are relatively detailed descriptions of the performance-monitoring equipment. These projects provide a basis for verification of analytic work aimed at determining the preferred solar system for any given utility service area, that is, the system that provides the lowest total cost to the consumer and to the utility. DOE

N82-33865# Department of Energy, Washington, D. C.
INTERNATIONAL ENERGY AGENCY INSTRUMENTED FACILITIES SURVEY FOR SOLAR ASSISTED LOW ENERGY DWELLINGS
Feb. 1982 144 p Prepared in cooperation with Burt, Hill, Kosar, Rittlemann, and Associates
(DE82-015158; DOE/NBM-2015158) Avail: NTIS HC A07/MF A01

The instrumentation of 38 active and passive solar projects in 9 countries (Denmark, Italy, Japan, Netherlands, Sweden, Switzerland, United Kingdom, United States, and West Germany) are outlined. Surveys are presented and the data are rearranged to compare answers from similar survey questions for each of the projects. Building, solar system and instrumentation descriptions and meteorological, solar system and building system instrumentation capabilities are addressed. DOE

N82-33866# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
RESIDENTIAL PHOTOVOLTAIC WORTH: A SUMMARY ASSESSMENT OF THE MIT ENERGY LABORATORY
Thomas L. Dinwoodie Jan. 1982 50 p refs
(Contract DE-AM01-76EI-02295)
(DE82-010867; MIT-EL-82-005) Avail: NTIS HC A04/MF A01

The role and significance of worth analysis in photovoltaic and similar program development is reviewed. Photovoltaic development is divided into three time frames: 1974 to 1982; 1982 to 1990; and 1990 to 2000. Several studies performed from 1974 to data are described in terms of their response to the evolving questions of photovoltaic economic worth. Several trends are discussed that should play a more or less direct role in the ultimate acceptance of photovoltaic technology from 1982 to 1990. The significant parameters affecting photovoltaic economics are defined and results of studies establishing allowable costs and investment figures of merit are presented. Photovoltaic investment worth on a US regional basis is analyzed. Alternative residential photovoltaic configurations are characterized and assessed. Studies tht examined photovoltaics and storage, PV/Thermal combined collector systems, and the difference between photovoltaic retrofit and new construction applications are summarized. DOE

N82-33867# EIC, Inc., Newton, Mass.
PREPARATION AND CHARACTERIZATION OF AMORPHOUS ZnAs FOR USE IN SOLAR CELLS Final Report, 15 Jul. 1980 - 14 Jan. 1981
R. D. Rauh, T. L. Rose, and A. N. Scoville Mar. 1982 31 p refs
(Contract DE-AC02-77CH-00178)
(DE82-014516; SERI/TR-9243-1-T1) Avail: NTIS HC A03/MF A01

Amorphous zinc arsenide films were prepared by flash evaporation and RF sputtering from both ZnAs2 and Zn3As2 polycrystalline material in addition to the conventional evaporation method used previously. Neither of the two methods resulted in improved control of the stoichiometry. The ratio of As to Zn, however, usually was between the values of 0.6 and 2.0 of the two stoichiometric crystalline compounds. Annealing of the films tended to change the stoichiometry towards an As/Zn ratio of 0.7 which is the value in the thermally more stable Zn3As2 compound. Physical deterioration of the films, however, was not observed until the temperature exceeded 3500 C. The optical band gap was determind from the absorption spectrum for a number of films with different stoichiometries. Although there was a slight trend towards higher band gap as the arsenic concentration increased, the dependence was not statistically significant. Similar results were obtained from measurement of some action spectra of the films using an electrochemical cell arrangement. The band gap is assigned a value of 1.3 + or - 0.2V for the stoichiometric range of ZnAs0 6 to ZnAs2 1. DOE

N82-33868# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA REPORT FOR THE NORTHWEST RESIDENTIAL EXPERIMENT STATION, DECEMBER 1981
M. C. Russell, P. Baghuraman, and P. C. Mahoney Apr. 1982 18 p refs
(Contract DE-AC02-76ET-20279)
(DE82-016027; DOE/ET-20279/192) Avail: NTIS HC A02/MF A01

One month of physical data obtained at the Northeast Residential Experiment Station in Concord, Massachusetts for state-of-the-art photovoltaic systems is presented. Included is a summary of meteorological information, electric energy used and produced, solar cell array and power conditioning unit data, and photovoltaic system-utility energy flow. The data are also tabulated hour-by-hour for an averaged day of the month, and a monthly load duration curve is given for each of the loads being monitored. Five prototype systems are under test, each consisting of a roof-mounted solar cell array, sized to meet at least 50% of the annual electrical demand of an energy-conserving house, and an enclosed structure to house the remainder of the system equipment, test instrumentation, and work space. The systems are grid-connected. Data are also provided for a full-sized photovoltaic residence in Carlisle, massachusetts. The methods of data analysis and reduction are discussed. DOE

N82-33869# Stanford Univ., Calif. High Temperature Gasdynamics Lab.
SYSTEM STUDY OF AN MHD/GAS TURBINE COMBINED-CYCLE BASELOAD POWER PLANT
K. D. Annen Aug. 1981 199 p refs
(Contract DE-AC01-80ET-15611)
(DE82-015215; DOE/ET-15611/T3; SU-HTGL-134) Avail: NTIS HC A09/MF A01

The magnetohydrodynaics (MHD) gas turbine systems were modeled with sufficient detail, using realistic component specifications and costs, so that that the thermal and economic performance of the systems could be accurately determined. Three cases of MHD gas turbine systems were studied, with Case I being similar to a MHD steam system so that a direct comparison of the performances could be made, with Case II being representative of a second generation MHD system, and with Case III considering oxygen enrichment for early commercial applications. The results show that the MHD gas turbine system has very good thermal and economic performances while requiring either little or no cooling water. Compared to the MHD steam system which has a cooling tower heat load of 720 MN, the Base Case I MHD/gas turbine system has a heat rate which is 13% higher and a cost of electricity which is only 7% higher while requiring no cooling water. Case II results show that an improved performance can be expected from second generation MHD gas turbine systems. Case III results

show that an oxygen enriched MHD gas turbine system may be attractive for early commercial applications in dry regions of the country. DOE

N82-33870# Kinetics Technology International Corp., Pasadena, Calif.
ASSESSMENT OF A COAL-GASIFICATION FUEL-CELL SYSTEM FOR UTILITY APPLICATION Final Report
P. G. Cronin, A. J. Murphy, R. J. Newton, and E. S. Wagner May 1982 163 p refs Sponsored by EPRI
(EPRI Proj. 1041-8)
(DE82-903667; EPRI-EM-2387) Avail: NTIS HC A08/MF A01

The technical and economic feasibility of a coal gasification-advanced phosphoric acid fuel cell power plant for electric utility application were defined and assessed. The system design criteria selected reslted in a modular, relatively small sized poer plant that could be configured with a basic building block of approximately 11 MW. A range of coals and lignite was evaluated as the basic feedstock for a low-Btu fixed-bed conventional air-blown coal gasifier. The system included gas processing, cleanup, compression and delivery of sulfur-free hydrogen-rich gas to an advanced phosphoric acid fuel cell. Equipment erection and operating costs, in 1981 dollars, were solicited from American industry for all process sections. The plant was designed and evaluated on the basis of low capital cost, lowest overall heat rate and, as far as possible, with off-the-shelf technology. A 44 MW lignite example plant utilizing the basic building block concept was defined and evaluated for Lincoln, Nebraska, as an example site. DOE

N82-33871# Gould, Inc., Rolling Meadows, Ill.
STUDY OF THE FUNDAMENTAL THERMAL-MANAGEMENT ASPECTS OF THE LITHIUM-ALUMINIUM/IRON SULFIDE BATTERY Final Report
H. F. Gibbard, C. C. Chen, and D. M. Chen 15 Jan. 1982 70 p refs
(Contract W-7405-eng-48)
(DE82-014441; DOE/NBM-2014441) Avail: NTIS HC A04/MF A01

The results of a fundamental study of the rate of internal generation of thermal energy in 200-Ah LiAl FeS cells, and the temperature distribution in a 2.5-kWh LiAl FeS battery under a variety of operating conditions are given. The rate of thermal energy generation was measured by two independent methods. The first is an indirect method, using thermodynaic calculations based on precise measurements of the cell potential as a function of temperature and state of charge, combined with measurements of the cell voltage during discharge at various constant currents. The second is the direct measurement of the rate of heat generation using a new high-temperature battery calorimeter. The results obtained by these two methods are in excellent agreement. A description is presented of the advantages of the calorimetric method of determining internal energy generation rates and thermodynamic functions. Measurements of the surface temperature cells in an operating battery heat-up, discharge and cooling tests are also described. DOE

N82-33872# Pacific Northwest Lab., Richland, Wash.
GEOTECHNICAL ISSUES AND GUIDELINES FOR STORAGE OF COMPRESSED AIR IN EXCAVATED HARD ROCK CAVERNS
R. D. Allen, T. J. Doherty, and A. F. Fossum Apr. 1982 160 p refs
(Contract DE-AC06-76RL-01830)
(DE82-015027; PNL-4180) Avail: NTIS HC A08/MF A01

The results of a literature survey on the stability of excavated hard rock caverns are presented. The objective was to develop geotechnical criteria for the design of compressed air energy storage (CAES) caverns in hard rock formations. These criteria involve geologic, hydrological, geochemical, geothermal, and in situ stress state characteristics of generic rock masses. Their relevance to CAES caverns, and the identification of required research areas, are identified. It is strongly suggested that the chief geotechnical issues for the development and operation of CAES caverns in hard rock are impermeability for containment, stability for sound openings, and hydrostatic balance. DOE

N82-33873# Procedyne Corp., New Brunswick, N. J.
CONVERSION OF WASTE PLASTICS TO FUEL OIL Final Report, 18 Sep. 1979 - 31 Oct. 1981
R. B. Roaper and J. Bhatia Oct. 1981 188 p refs
(Contract DE-AC01-79CS-40076)
(DE82-002454; DOE/CS-40076/T1) Avail: NTIS HC A09/MF A01

Most of the plastics in use in the world today are produced from crude oil. This increased use of plastics results in an increased generation of discard and waste. In the case of thermoplastics, the types which constitute the bulk of the plastics in high volume use, it is theoretically possible to recycle discard and waste into virgin plastics. However, due to type incompatibility, and contamination with foreign materials, this approach has not proven economically feasible except for a smal quantity of the discard and waste stream. A pyrolysis process was successfully demonstrated which converted atactic polypropylene, APP, to fuel oil and a small fraction of fuel gas. In the current program, a commercial plant, with capacity of 17,000,000 lb/year feedstock, was designed for the pyrolysis of APP waste to fuel oil. In addition, the feasibility of this approach was extended to waste or discarded isotactic polypropylene, PP, and low density polyethylene, LDPE, through pilot plant work, process design, and economic considerations. DOE

N82-33874# Fuel and Energy Consultants, Inc., New York, N.Y.
ASSESSMENT OF ENERGY SAVING TECHNOLOGIES WITH POTENTIAL FOR APPLICATIONS IN US INDUSTRIES
Jan. 1982 215 p
(Contract DE-AC06-76RL-01830)
(DE82-012571; DOE/NBB-0002) Avail: NTIS HC A10/MF A01

The purpose of this study was to assess and evaluate information on energy technologies displayed at international trade shows was assessed and evaluated. Technologies that had potential for saving energy in applications in US industries were identified. These technologies are identified and concise summaries on potential energy savings, economics, basic operational considerations, and potential applications are prepared. An objective of this study was to determine whether international trade shows can provide a convenient and useful forum for the identification of energy saving technologies which could have wider applications in US industry. Forty-four technologies were chosen for inclusion which are grouped into the following categories: heat recovery devices, heat exchangers, heat pumps, and various other technologies. Some of the technologies include: a low energy drying system, solid waste in cement manufacturing, boiler fuel optimization system, multifuel boiler plant and coal combustion efficiency improvements. DOE

N82-33875# Pacific Northwest Lab., Richland, Wash.
IDENTIFICATION OF ENERGY CONSERVATION RESEARCH OPPORTUNITIES: A REVIEW AND SYNTHESIS OF THE LITERATURE
W. J. Hopp, G. J. Hane, W. E. Gurwell, S. G. Hauser, R. E. Williford, T. A. Williams, and W. B. Ashton Mar. 1982 293 p refs
(Contract DE-AC06-76RL-01830)
(DE82-015028; PNL-3966) Avail: NTIS HC A13/MF A01

Thirty-eight studies of energy conservation research opportunities are reviewed. The 38 studies chosen for review include many of the major efforts in the identification of energy conservation research and development (R and D) opportunities and provide a representative sample of the types of studies that were performed. The sample includes studies that focus on specific energy use (e.g., auto transport), as well as studies that focus on specific types of research (e.g., materials science). The sample also includes studies that can be further contrasted in terms of long-term vs. short-term projects, evolutionary vs. revolutionary ideas, generic vs. process-specific activities, and technology base research vs. hardware development. Each of these perspectives contributes toward assuring coverage of the breadth of energy conservation

R and D opportunities. In each review the technical or end-use focus is described, the research ideas identified in the study are listed, and a critical summary is given. The reviews also indicate whether the studies present end-use consumption data, estimate potential energy savings, estimate times to commercialization, summarize existing research programs, or describe the identification methodology. DOE

N82-33876# Westinghouse Research and Development Center, Pittsburgh, Pa. Chemical Engineering Dept.
MECHANISMS AFFECTING MASS TRANSFER IN FUEL CELLS
Richard A. Wenglarz 15 Mar. 1982 27 p refs
(Contract DE-AM06-77RL-00600)
(DE82-013431; DOE/RL-00600/T1) Avail: NTIS HC A03/MF A01

Particulate effects on molten carbonate fuel cells were analyzed. The analysis has been applied to a conceptual fuel cell with operating parameters appropriate to use with future power generation plants. Particle transport due to several mechanisms was considered and dominant mechanisms affecting particle delivery to anode channel surfaces and into anode pores were identified. Thermophoresis and gas flow out from anode pores are found to inhibit particle arrival on the anode and entry into pores so that neither anode channel blockage nor pore blockage are expected for particles with diameters smaller than about one micron. It is suggested that analytical approach could be applied to other fuel cell types in addition to the molten carbonate fuel cells. DOE

N82-33877# United Engineers and Constructors, Inc., Philadelphia, Pa.
PRELIMINARY DESIGN STUDY OF COMPRESSED-AIR ENERGY STORAGE IN A SALT DOME. VOLUME 1: EXECUTIVE SUMMARY Final Report
Jan. 1982 68 p 7 Vol.
(Contract DE-AC01-77ET-29332; EPRI Proj. 1081-2)
(DE82-008345; DOE/ET-5054/1; EPRI-EM-2210-Vol-1) Avail: NTIS HC A04/MF A01

The preliminary design and cost estimate of a compressed air energy storage (CAES) plant located in the Middle South Utilities (MSU) system are summarized. The 220 MWe CAES plant stores air in two solution mined salt caverns. The facility criteria, site selection and the turbomachinery and auxiliaries, and an outline of the proposed procedure for developing the caverns are described. The preliminary CAES plant design was prepared and the capital cost estimate, cash low and project schedule were developed. A CAES plant does not appear to be economic in the MSU system before the mid 1990s which is due to the unique features of the MSU system. DOE

N82-33878# Institute of Public Administration, Washington, D.C.
ASSESSMENT OF THE FIELD STATUS OF ACTIVE SOLAR SYSTEMS. VOLUME 2: APPENDICES Final Report
Jan. 1982 209 p refs
(Contract DE-AC03-80SF-11485)
(DE82-016032; DOE/SF-11485/T1-Vol-2) Avail: NTIS HC A10/MF A01

The range of materials and corrosion problems, either encountered or anticipated, in current systems are reviewed critically with emphasis on materials degradation under the special and demanding conditions of solar heating as opposed to normal domestic hot water and space heating systems. A selected bibliography of available relevant reports and studies is included. DOE

N82-33879# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 4: BEVERLY HIGH SCHOOL, BEVERLY, MASS.
Jan. 1982 44 p
(Contract DE-AC04-76DP-00789)
(DE82-008622; SAND-81-7088/4) Avail: NTIS HC A03/MF A01

Performance data are presented for the months of November and December, 1981 for a photovoltaic power supply at a Massachusetts school building. The data include: monthly and daily electrical energy produced; monthly and daily solar energy received; monthly and daily array efficiency; energy produced as a function of power level, voltage, cell temperature, and hour of the day; input, output, and efficiency of two power conditioner units and for the total power conditioning system; energy supplied by the photovoltaic system to the load during each day and month; photovoltaic system efficiency; capacity factor; daily system availability; monthly and hourly insolation; heating and cooling degree days; number of freeze-thaw cycles per month; monthly and hourly ambient temperature; monthly and hourly wind speed; wind direction distribution; hourly cell temperature; and data acquisition mode and recording interval plot. DOE

N82-33880# Franklin Research Center, Philadelphia, Pa.
ENERGY-CONSERVING PASSIVE SOLAR MULTI-FAMILY RETROFIT PROJECTS. CYCLE 5, CATEGORY 1: HUD SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM
1981 100 p refs Sponsored in part by DOE
(Contract HUD-H-2377)
(PB82-180944; HUD-0002338) Avail: NTIS HC A05/MF A01 CSCL 13A

A total of 14 passive solar retrofit buildings are described. The concept of passive solar energy and the various types of passive systems found in the Cycle 5 projects are discussed. Each of the 14 solar designs is described, and some of the key points raised in the discussion of passive concepts are illustrated. Each project description cites the location of the passive solar home and presents the following information: grantee/builder, designer, solar designer, price, number of units, net heated area, heat load, degree days, solar fraction of the total heat load, and auxiliary heat required. Project descriptions also include data on recognition factors (the five passive elements necessary for a complete passive system), the type of auxiliary heating system used in the building, the solar water heating system (if any), and the passive cooling techniques used (if any). GRA

N82-33881# United Technologies Corp., South Windsor, Conn.
EVALUATION OF NATURAL GAS MOLTEN CARBONATE FUEL CELL POWER PLANTS Final Report, 1 Mar. 1980 - 1 May 1981
J. M. King, A. H. Levy, L. L. VanDine, and R. J. Wertheim Aug. 1981 157 p refs Sponsored by Gas Research Inst.
(PB82-181272; FCR-3522-2; GRI-81/0038) Avail: NTIS HC A08/MF A01 CSCL 10B

Three advanced molten carbonate fuel cell power plant concepts designed to provide greater quantities of high quality reject heat show significant advantage over both advanced phosphoric acid systems and conventional molten carbonate systems for industrial cogeneration with natural gas. Cost and energy savings with the best system (internal reforming) are 20 and 15 percent respectively when compared to a conventional utility approach with purchased power. The other advanced systems, anode exhaust recycle through an adiabatic reformer and steam separator, also show significant savings. Technology goals and cell stack sizes are consistent with the objectives of other programs meeting both cost and endurance goals, all of which are important to the success of the industrial cogeneration application. GRA

N82-33882# New York State Dept. of Environmental Conservation, Albany.
ELECTRICAL ENERGY CONSUMPTION AND HEATING REQUIREMENTS OF MUNICIPAL WASTEWATER TREATMENT PLANTS Final Report
Mu Hao Wang and Lawrence K. Wang Feb. 1982 35 p refs Prepared for Lenox Inst. for Research, Inc., Mass.
(PB82-183393; LIR/12-81/1) Avail: NTIS HC A03/MF A01 CSCL 10A

Electrical energy consumption models were developed. The unit operations/processes of pumping, screening and comminution,, grit removal, sedimentation, chlorination, gravity thickening, anaerobic digestion, vacuum filtration, incineration, and diffused air flotation are examined. The mathematical models of total heating

requirements of biological wastewater treatment plants are also presented. GRA

N82-33883# National Bureau of Standards, Washington, D.C. National Engineering Lab.
RESIDENTIAL SOLAR DATA CENTER: DATA RESOURCES AND REPORTS Final Report, Sep. 1979 - Sep. 1981
Patricia M. Christopher and Audrey O. Houser Oct. 1981 67 p refs
(Contract IAA-H-5481)
(PB82-180845; NBSIR-81-2369) Avail: NTIS HC A04/MF A01 CSCL 10A

The Residential Solar Data Center (SDC) was responsible for the establishment and operation of a computerized data base containing non-instrumented residential data collected from the DoE/HUD Solar Heating and Cooling Demonstration Program. This document includes a summary of the history and background of the SDC and its role in the demonstration program, a list of the final computer reports which are available, sample pages of representative reports, and a description of the data files which comprised the solar data base. Author

N82-33884# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
ENERGY LABORATORY DATA AND MODEL DIRECTORY Final Report
S. Lahiri and J. Carson Jul. 1981 180 p refs
(PB82-180274; MIT-EL-81-025) Avail: NTIS HC A09/MF A01 CSCL 10A

Over the past several years M.I.T. faculty, staff, and students have produced a substantial body of research and analysis relating to the production, conversion, and use of energy in domestic and international markets. Much of this research takes the form of models and associated data bases that have enduring value in policy studies (models) and in supporting related research and modeling efforts (date). For such models and data it is important to ensure that the useful life cycle does not end with the conclusion of the research project. This directory is an important step in extending the usefulness of models and data bases available at the M.I.T. Energy Laboratory. It will be updated from time to time to include new models and data bases that have been developed, or significant changes that have occurred. Author

N82-33885# Montana Energy and MHB Research and Development Inst., Inc., Butte. Center for Innovation.
THE MONTANA ENERGY AND MHD DEVELOPMENT INSTITUTE, INC. Final Report
Oct. 1981 124 p
(Grant EDA-05-06-01815-40)
(PB82-176926; EDA-82-0020) Avail: NTIS HC A06/MF A01 CSCL 05C

The business of commercializing a new product, service, or technique is examined. In most instances, inventors are not equipped to provide, either from their own capabilities or through paying for others, the necessities. The services of legitimate organizations, such as the Center for Innovation, are very badly needed. The center's operation deals primarily with independent inventors versus those associated with large or even small corporations. GRA

N82-33886# Center for Renewable Resources, Washington, D.C.
COMPETITION IN THE PHOTOVOLTAICS INDUSTRY: A QUESTION OF BALANCE Final Report
Barrett Stambler 1 Feb. 1981 227 p refs
(Contract SB-81-975)
(PB82-171570) Avail: NTIS HC A11/MF A01 CSCL 05C

The photovoltaics industry is profiled and the potential for competition as the industry matures is analyzed. Problems associated with small business' involvement are discussed and the effects of government programs on competition are examined. GRA

N82-33887# Economic Research Service, Washington, D. C. National Economics Div.
SOLAR- AND WIND-POWERED IRRIGATION SYSTEMS
Robert V. Enochian Feb. 1982 34 p refs
(PB82-177486; AER-482) Avail: NTIS HC A03/MF A01 CSCL 02C

Five different direct solar and wind energy systems are technically feasible for powering irrigation pumps. However, with projected rates of fossil fuel costs, only two may produce significant unsubsidized energy for irrigation pumping before the turn of the century. These are photovoltaic systems with nonconcentrating collectors (providing that projected costs of manufacturing solar cells prove correct); and wind systems, especially in remote areas where adequate wind is available. Author (GRA)

N82-33888# National Oceanic and Atmospheric Administration, Washington, D. C.
OCEAN THERMAL ENERGY CONVERSION, FISCAL YEAR 1981. PUBLIC LAW 96-320 Report to Congress
Feb. 1982 42 p
Avail: NTIS HC A03/MF A01 CSCL 10A

The background of Ocean Thermal Energy Conversion (OTEC) which deals with the national interest and the nature of the industry, and OTEC technology, the legal regime, environmental considerations and the international impact and future of OTEC are discussed. At the current time no amendments to the ACT are recommended. Several areas in which technical amendments would clarify the original intent of the Act are analyzed. The most significant of these relates to the specific requirements for issuance of OTEC licenses for facilities that are located partly on land and partly in ocean waters. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-33889# Committee on Environment and Public Works (U. S. Senate).
ACID RAIN
Washington GPO 1982 792 p refs Hearing on S. 1706, S. 1709 and S. 1718 before the Comm. on Environ. and Public Works, 97th Congr., 1st Sess., 29 Oct. 1981
(GPO-87-365) Avail: Committee on Environment and Public Works

The long range transport of pollutants is discussed. The transformation of some types of chemicals during their airborne journeys so that they come back to Earth as acid is also considered. S.L.

N82-33890*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NASA PARTICIPATION IN THE 1980 PEPE/NEROS PROJECT: DATA ARCHIVE
Dana A. Brewer (Systems and Applied Sciences Corp., Hampton, Va.), Ellis E. Remsberg, Gladys R. Loar, and Richard J. Bendura Jul. 1982 92 p refs
(NASA-TM-83189; NAS 1.15:83189) Avail: NTIS HC A05/MF A01 CSCL 13B

Eight experimental air quality measurement systems were investigated during July and August 1980 as part of the EPA PEPE/NEROS fiel measurement program. Data from those efforts have been entered into an archive that may be accessed by other researchers. The data sets consists of airborne measurements of regional mixed layer heights and aerosol and ozone distributions as well as point measurements of meteorological parameters and ozone obtained during diurnal transitions in the planetary boundary layer. This report gives a discussion of each measurement system, a preliminary assessment of data quality, a description of the archive format for each data set, and a summary of several proposed scientific studies which will utilize these data. B.W.

N82-33891*# INTERA Environmental Consultants Ltd., Ottawa (Ontario).
ANALYSIS OF REMOTE SENSING DATA COLLECTED FOR DETECTION AND MAPPING OF OIL SPILLS: REDUCTION AND ANALYSIS OF MULTI-SENSOR AIRBORNE DATA OF THE NASA WALLOPS OIL SPILL EXERCISE OF NOVEMBER 1978 Final Report
May 1982 241 p refs
(Contract NAS1-16178)
(NASA-CR-165886; NAS 1.26:165886) Avail: NTIS HC A11/MF A01 CSCL 13B

Airborne, remotely sensed data of the NASA Wallops controlled oil spill were corrected, reduced and analysed. Sensor performance comparisons were made by registering data sets from different sensors, which were near-coincident in time and location. Multi-spectral scanner images were, in turn, overlayed with profiles of correlation between airborne and laboratory-acquired fluorosensor spectra of oil; oil-thickness contours derived (by NASA) from a scanning fluorosensor and also from a two-channel scanning microwave radiometer; and synthetic aperture radar X-HH images. Microwave scatterometer data were correlated with dual-channel (UV and TIR) line scanner images of the oil slick. Author

N82-33892# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
ENGINEERING GEOLOGY AND GEOMORPHOLOGY OF STREAMBANK EROSION. REPORT 3: THE APPLICATION OF WATERBORNE GEOPHYSICAL TECHNIQUES IN FLUVIAL ENVIRONMENTS
John R. May Feb. 1982 255 p refs
(AD-A115678; TR-GL-97-7) Avail: NTIS HC A12/MF A01 CSCL 08/8

The performance, application, and capability of selected waterborne acoustic profiling systems for streambank erosion studies in fluvial environments are evaluated. Additional objectives were to present types of available survey systems and related support equipment and to describe techniques for using the stystems and equipment. The principal types of acoustic survey systems discussed in this report are: (a) continuous seismic reflection profiling (CSRP) systems, (b) sidescanning sonar systems, and (c) bathymetric profiling systems. Basic system components, i.e., sound sources, graphic recorders, hydrophones, transceivers, etc. are identified. The operational principles and characteristics of system components are discussed. System limitations and environmental constraints, i.e., frequency, resolution, water depths, weather, bottom and subbottom composition, porosity and density of sediments, etc., are described. Support equipment requirements for conducting waterborne geophysical surveys, i.e., survey boats, positioning equipment, bathymetric profiling systems, and sampling equipment, are also included. Personnel requirements, selection of survey systems, collection and use of background and historical information, and suggested operation and towing techniques for waterborne geophysical systems are additional topics discussed. Author

N82-33893# Little (Arthur D.), Inc., Cambridge, Mass.
SUPERCRITICAL CARBON DIOXIDE REGENERATION OF ACTIVATED CARBON LOADED WITH CONTAMINANTS FROM ROCKY MOUNTAIN ARSENAL WELL WATER Final Report, Sep. 1980 - May 1982
Rosemary Murphy OBrien, Richard P. DeFilippi, Clinton E. Smith, and Donald G. Hager May 1982 63 p refs
(Contract DAAK70-79-D-0036)
(AD-A116842; ADL-83670-35) Avail: NTIS HC A04/MF A01 CSCL 13/2

The method of supercritical carbon dioxide (SCF CO2) regeneration of granular activated carbon (GAC) loaded with DIMP (diisopropyl methylphosphonate) from Rocky Mountain Arsenal Well (NO. 23-120) water was investigated. A laboratory-based adsorption/regeneration study was done in two parts. Part one compared the performance of three commercially available granular activated carbons as adsorbents for DIMP using SCF CO2 regeneration. Part two compared the effectiveness of SCF CO2 regeneration versus conventional thermal regeneration for one commercial GAC loaded with DIMP from RMA Well No 23-120. Economic evaluations based on the test data for the SCF CO2 regeneration system and for a conventional thermal regeneration system were made. Results indicated that thermal regeneration outperformed the supercritical process in restoring carbon capacity for DIMP. Results of the economic evaluation also indicated that the cost of the carbon regeneration step in the treatment of 600 GPM of RMA groundwater is $0.56 per 1000 gallons of water for the thermal process and $1.41 per 1000 gallons of water for the supercritical process. Author (GRA)

N82-33894# Flow Analysis Associates, Ithaca, N.Y.
A THEORETICAL APPRAISAL OF THE JOINT EFFECTS OF TURBULENCE AND OF LANGMUIR CIRCULATIONS ON THE DISPERSION OF OIL SPILLED IN THE SEA Final Report
S. Leibovich and J. L. Lumley Sep. 1981 124 p refs
(Contract DTCG23-80-C-20019)
(AD-A117844; FAA-8101; USCG-D-26-82) Avail: NTIS HC A06/MF A01 CSCL 13/2

The extent to which oil spilled at sea can be dispersed by the action of oceanic turbulence and of Langmuir circulations is investigated theoretically. The bulk of the study concerns the mixing of oil, in the form of small noninteracting particles, into the water column. Computer simulations using physically derived models of turbulent dispersion and of Langmuir circulations indicate that bouyant oil particles can be suspended to depths of tens of meters under moderate environmental conditions. This is thought to explain the deep oil observed under oil slicks from the IXTOC-I incident in the Gulf of Mexico. In addition, a simple model is devised to estimate the thickness and total volume of oil collected into windrows on the water surface. Author (GRA)

N82-33895# Tennessee Valley Authority, Muscle Shoals, Ala. Div. of Energy Demonstrations and Technology.
PRELIMINARY ECONOMIC ANALYSIS OF NO SUB X FLUE-GAS TREATMENT PROCESSES USING TVA AND EPRI ECONOMIC PREMISES Final Report
J. D. Maxwell, T. W. Tarkington, and T. A. Burnett Dec. 1981 238 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 783-3)
(DE82-902223; EPRI-CS-2075) Avail: NTIS HC A11/MF A01

A preliminary level economic evaluation is made using design premises to compare seven flue gas treatment (FGT) processes for removal of nitrogen oxides (NO sub x) from power plant flue gas. The case examined is a 500 MW unit burning 3.5% sulfur coal and emitting 600 ppM NO sub x in the flue gas. A minimum removal efficiency of 90% for sulfur oxides (SO sub x) and NO sub x and 99.5% for particulates is assumed. To permit comparisons of the dry NO sub x FGT systems with the wet SO sub x - NO sub x systems, which also remove particulates, the costs of both a limestone slurry flue gas desulfurization (FGD) unit and an electrostatic precipitator (ESP) are added to the cost of the dry NO sub x - only processes and the cost of an ESP is added to the cost of the dry SO sub x NO sub x process. The wet SO sub x - NO sub x system and dry NO sub x systems (either SO sub x - NO sub x or NO sub x - only processes) have capital cost ranges of 205 $/kW to 482 $/kW, and 165 $/kW to 175 $/kW, respectively. DOE

N82-33896# Institute of Ecology, Indianapolis, Ind.
PROSPECTIVE SIGNIFICANCE OF TEMPERAT-ZONE CARBON POOL TRANSIENTS, 1980 - 2010
T. V. Armentano and O. L. Loucks 1981 34 p refs Presented at the Symp. on Global Dyn. of Biospheric Carbon, Bloomington, Ind., 17 Aug. 1981
(Contract DE-AC02-81EV-10725)
(DE82-011866; DOE/EV-10725/1) Avail: NTIS HC A03/MF A01

The extent to which the temperate zone sink for carbon will be limited by increased forest utilization which is a major question for biospheric carbon balances over the next two decades is discussed. Over the past 100 years, shifts in global carbon pools have operated asynchronously, with carbon storage at any time

dependent on the net difference between opposing fluxes. The regrowth and soil sequestering transients of the last 60 years in the temperate zone tended to balance releases of carbon from other sources. Increased utilization of forests and other biospheric pools for fibre and energy may bring about similar responses worldwide with the temperate zone behaving more as a ource of carbon dioxide. It is shown that the net carbon increment in US forests could be greatly reduced or eliminated in 20 to 30 years if an annual harvest rate of wood equivalent to 10 quads of energy prevails. The increment would be lost even if complete use of logging and manufacturing residues were attained. It is concluded that without complete residue utilization for energy, the carbon increment would be depleted more rapidly. DOE

N82-33897# Battelle Columbus Labs., Ohio.
NITROGEN OXIDE TRANSFORMATIONS IN POWER-PLANT PLUMES Interim Report
G. M. Sverdrup, C. W. Spicer, and M. R. Kuhlman Jan. 1982 158 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1369-1)
(DE82-901847; EPRI-EA-2217) Avail: NTIS HC A08/MF A01

The chemical transformations which nitrogen oxides might undergo after emission from fossil fueled power plants are described. Kinetic data are obtaned on the conversion of NO to NO2 and further oxidation of NO2 to form gaseous and particulate nitrates to be used in the development of chemical component for inclusion in reactive plume models. The models assess the impact of emitted No/sub x/ on downwind air quality with resulting impacts on health and visibility, as well as acid precipitation. The objectives are to: (1) identify those reactions involving NO/sub x/ which are potentially important in power plant plumes; (2) acquire chemical kinetic data on those reactions where uncertainty exists; and (3) provide improved chemical kinetic models for estimation of the fate of NO/sub x/ in power plant plumes. The experimental design involves experiments on near and far field homogeneous chemistry and heterogeneous chemistry. DOE

N82-33898# Battelle Columbus Labs., Ohio.
EVALUATION OF TERRESTRIAL MICROCOSMS FOR ASSESSING ECOLOGICAL EFFECTS OF UTILITY WASTES Interim Report
P. VanVoris, M. F. Arthur, and D. A. Tolle Apr. 1982 175 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1224-5)
(DE82-903730; EPRI-EA-2364) Avail: NTIS HC A08/MF A01

The utility of microcosms (intact agricultural soil cores) in assessing ecosystem response to various levels of fly ash was determined. The suitability of microcosms as a technique for evaluating the potential environmental impacts of utility wastes prior to the adoption of this approach as a required test protocol was investigated. Soil water from both microcosms and field plots was analyzed for nutrient loss and pH. Microcosms and field plots were compared for net primary productivity and the uptake of 16 potentially toxic trace elements. It is found that microcosms are a cost effective technique for tracking ecosystem processes such as nutrient loss and trace element uptake. Chemical characterization of the fly ash and trends in nutrient loss data indicate that nitrate nitrogen is the best early warning indicator of system disruption from fly ash application. DOE

N82-33899# Los Alamos Scientific Lab., N. Mex.
CALCULATIONS OF INCREASED SOLAR UV FLUXES AND DUV DOSES DUE TO STRATOSPHERIC-OZONE DEPLETIONS
A. Zardecki and S. A. W. Gerstl Feb. 1982 66 p refs
(Contract W-7405-eng-36)
(DE82-009996; LA-9233-MS) Avail: NTIS HC A04/MF A01

Accurate radiative transfer calculations are performed in the middle ultraviolet spectral region for aerosol-loaded atmospheres with the goal of determining the solar irradiance at the ground and quantifying the irradiance perturbations due to the presence of aerosols and various ozone depletions. The extent of the increase of UV-B radiation as a function of wave-length and solar zenith angle is calculated for five model atmospheres. In addition, the damaging ultraviolet dose rates and radiation amplification factors are evaluated at different latitudes and seasons for erythemal and DNA action spectra. DOE

N82-33900# Lovelace Biomedical and Environmental Research Inst., Albuquerque, N. Mex. Inhalation Toxicology Research Inst.
POTENTIAL HEALTH AND ENVIRONMENTAL EFFECTS OF THE FLUIDIZED-BED COMBUSTION OF COAL
F. A. Seiler, C. H. Hobbs, and R. G. Cuddihy Feb. 1982 58 p refs
(Contract DE-AC04-76EV-01013)
(DE82-014389; LMF-90) Avail: NTIS HC A04/MF A01

A summary of the potential health and environmental effects of burning coal by fluidized bed combustion is presented. An increased use of coal combustion as a whole, an increasing fraction of which may be burned at the low temperture of fluidized bed combustors (FBC), is causing concern about potential health and environmental effects. The following concerns are addressed: the use of coal and the FBC market penetration projected for the year 2000; the use of raw materials and the production of effluents and wastes by the industry; the health risks to both workers and the public of operating the powe plant and of mining, transporting and preparing the raw materials necessary and disposing of the wastes; the environmental levels of effluents and waste products; and the resulting damage to human health, the environment, and materials. Results of a first analysis of the health and environmental risks due to coal combustion in FBC power plants are discussed. DOE

N82-33901# Lovelace Biomedical and Environmental Research Inst., Albuquerque, N. Mex. Inhalation Toxicology Research Inst.
POTENTIAL HEALTH AND ENVIRONMENTAL EFFECTS OF LIGHT-DUTY DIESEL VEHICLES, 2
R. G. Cuddihy, W. C. Griffith, C. R. Clark, and R. O. MCClellan Oct. 1981 107 p refs
(Contract DE-AC04-76EV-01013)
(DE82-014390; LMF-89) Avail: NTIS HC A06/MF A01

Occupational risks in the diesel reference industries, characteristics of light duty diesel vehicle emissions, potential environmental impacts of light duty diesel vehicles, exposures of people to diesel exhaust emissions, models for evaluating health risks to people from exposures to diesel vehicle exhaust, projected health reisks from use of light duty diesel vehicles, and research needs are discussed. Reslts of computer simulation studies indicated that if diesel engines were used in 20% of light duty vehicles, little change would be expected in urban air concentrations of vapor phase hydrocarbons, nitrogen oxides, nitric and nitrous acid, ozone, hydrogen peroxide, and carbon monoxide. Several methods were developed to estimate cancer risk in people exposed to diesel exhaust particles. Results of two of the methods indicated that there would be 0.1 and 0.15 cancers per 100,000 people per SIGMA q/m sub 3 average lifetime exposure to diesel particles. DOE

N82-33902# Lenox Inst. for Research, Inc., Mass.
SYMPOSIUM ON ENVIRONMENTAL TECHNOLOGY AND MANAGEMENT
Lawrence K. Wang, ed. Jan. 1982 109 p refs Symp. held at New York, N. Y., 12 Oct. 1980; sponsored by the Chinese-American Engineering and Management Inst. and the Chinese-American Academic Professional Association
(PB82-185273; LIR/12-81/5) Avail: NTIS HC A06/MF A01 CSCL 13B

Hazardous waste disposal techniques are discussed in relation to petroleum refining and nuclear wastes. The environmental impacts are considered for sludge leachate treatment and coal utilization. S.L.

N82-33903# National Academy of Sciences - National Research Council, Washington, D. C. Commission on Natural Resources.
COAL MINING AND GROUND-WATER RESOURCES IN THE UNITED STATES Final Report
1981 214 p refs

(PB82-182056; LC-81-83977; ISBN-0-309-03186-9) Avail: NTIS HC A10/MF A01 CSCL 13B

The widespread concern in this country over possible consequences for our water resources of the relatively recent emphasis on development of fossil fuels and the reclamation and use of land that will follow it is noted. The response to the public concern as reflected in legislation and policy focused on two issues. one is that water resources are not everywhere or always present in sufficient quanitity or quality to satisfy the needs of the energy industry. The other is that, as a result of energy industry and land reclamation activity, the quality of the water that is available may be significantly degraded. Coal mining is discussed as one of many uses competing for the nation's ground water resources. Principles that govern the functioning of hydrogeologic systems and the various institutions that oversee ground water allocation are discussed. GRA

N82-33904# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Indoor Pollutants.
INDOOR POLLUTANTS
Mar. 1982 555 p refs
(PB82-180563; EPA-600/6-82-001) Avail: NTIS HC A24/MF A01 CSCL 13B

The quality of the indoor environment primarily with respect to airborne pollutants although others are discussed, and the potential adverse health effects of indoor pollutants are considered. The research needed for abatement of indoor pollution was identified. Indoor' refers to the environments in homes, schools, public buildings, and similar spaces to which the public has access; industrial working environments, however, are excluded from consideration. GRA

N82-33905# CONCAWE, Hague (Netherlands).
SAMPLING AND MEASUREMENT OF PARTICULATE EMISSIONS FROM REFINERY INSTALLATIONS
R. W. Butcher, H. Ch. Frohne, M. Gergaud, J. R. Gordon, and H. J. A. Schuurmans 1980 97 p refs
(PB82-174665; ; CONCAWE-4/80) Copyright. Avail: NTIS HC A05/MF A01 CSCL 13B

Techniques for measuring and characterizing the emissions of particulate matter from refinery stationary sources are reviewed. Particulate matter is characteried by its physical and chemical properties. Generaly, emission standards identify two important physical properties: opacity (visible emissions) and total particulate mass concentration. The state of the art in instrumentation was broadly divided into determination of total mass emissions by manual and automatic techniques, smoke density by optical methods, and particle size measurement using both in-situ and laboratory type instruments. GRA

N82-33906# CONCAWE, Hague (Netherlands).
SAMPLING OF LIQUID EFFLUENTS FROM REFINERIES
A. Marmin, M. Buongiorno, J. P. Klein, S. T. Kolaczkowski, G. H. Mansfield, T. Palmer, C. Rayner, and P. vanderWee Jul. 1980 47 p refs
(PB82-174657; CONCAWE-7/80) Avail: NTIS HC A03/MF A01 CSCL 13B

Considerable effort is expended at a refinery to ensure an acceptable effluent quality. This manifests itself in a number of forms, e.g., in the close supervision of processes to minimize material discharge and in the existence of a large number of effluent treatment stages. Thus the sampling and analysis of a refinery's effluent is of paramount importance since it is the last step in the control of the treatment process before discharge into the environment. A critical review of the sampling of liquid effluents is presented. GRA

N82-33907# Hammond (Katherine A. Green), Houston, Tex.
ENVIRONMENTAL ASPECTS OF POTENTIAL PETROLEUM EXPLORATION AND EXPLOITATION IN ANTARCTICA: FORECASTING AND EVALUATING RISKS Final Report
Katherine A. Green Hammond Feb. 1982 34 p refs
(PB82-169772; MMC-81/06) Avail: NTIS HC A03/MF A01 CSCL 13B

Information concerning the possible environmental and other effects of offshore oil and gas exploration and exploitation in the Antarctic is given. A variety of factors that should be considered to determine whether the risk of possible adverse effects is unacceptable are discussed. Information which will be required to make the 'risk' determinations is identified. GRA

N82-33908# CONCAWE, Hague (Netherlands). Indutrial Hygiene Sub-Group.
GUIDELINES FOR THE DETERMINATION OF ATMOSPHERIC CONDITIONS OF OIL MISTS
A. R. Eyres, F. Christian, M. F. Claydon, G. Guelfo, B. E. Keal, H. Lenge, J. G. Mitchell, M. K. B. Molyneux, J. P. Moore, G. Rousseaux et al Jan. 1981 19 p
(PB82-174251; CONCAWE-1/81) Copyright. Avail: NTIS HC A02/MF A01 CSCL 06I

Petroleum Companies frequently receive requests for advice from users of lubricating fluids on suitable techniques for sampling and analysis of oil mist in work atmospheres. The Industrial Hygiene Subgroup of the CONCAWE Health Advisory Group has reviewed some of the methods currently in use and now provides general details of those considered to be satisfactory for the measurement of oil mists at concentrations typically encountered in industrial situations. The methods described in this report are only applicable to mineral oil products forming stable particulate mists. They may not be applicable to more volatile products where particulates are readily transformed to vapor. Care is therefore needed in assessing the validity of the methods for products used in the particular location under study. Author

N82-33909# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Aldehydes.
FORMALDEHYDE AND OTHER ALDEHYDES
Mar. 1982 352 p refs
(Contract EPA-68-01-4655)
(PB82-180498; EPA-600/6-82-002) Avail: NTIS HC A16/MF A01 CSCL 06H

The more important aldehydes that pollute the environment, the sources of their emission, their concentrations, their transformation and transport, their effects on the health of animals and humans, and their effects on the aquatic and terrestrial environments are examined. GRA

N82-33910# Environmental Protection Agency, Denver, Colo. Surveillance and Analysis Div.
AIR QUALITY TRENDS IN REGION 8, 1980 DATA Final Report
William H. Tabor, Thomas A. Entzminger, and Stephen C. Ball Sep. 1981 131 p
(PB82-204074; EPA-908/1-81-002) Avail: NTIS HC A03/MF A01 CSCL 13B

Air quality trends and status for the calendar year 1980 were determined for the six stats in Region VIII. These states include Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming. Data resident in the SAROAD national data bank was analyzed. Statistical test which detect significant differences between two populations were utilized to identify trends. The status and severity of air pollutants was reported as a direct measure of air quality standard and alert level exceedences. A summary of air quality in each nonattainment area is included. Author

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N82-33911 Johns Hopkins Univ., Baltimore, Md.
INTERPRETATION OF THE EARTH'S GRAVITY FIELD Ph.D. Thesis

Bakul Banerjee 1981 219 p
Avail: Univ. Microfilms Order No. 8205078

A set of point mass anomalies modeling a particularly chosen observed free air gravity anomaly field up to degree and order 12 of the Earth was determined. The best choice of this reference model was found to be the Goddard Earth Model 9. The zonal spherical harmonics was proven to determine the main geometry of the gravity field. Different statistical quantities associated with the set of spherical co-efficients were used to analyze the models of point masses buried throughout the mantle in two groups: (1) random distribution scattered over different depths, having random masses with positive or negative signs, (2) geophysically plausible distributons using the knowledge of subducting plates and the sources of negative gravity anomalies. The power spectra of typical configurations of point masses and truncated cones were calculated. The estimation of the density distributions via information theory was attempted. Dissert. Abstr.

N82-33912 Johns Hopkins Univ., Baltimore, Md.
STRUCTURAL GEOMETRY OF THE SNAKE RIVER RANGE, IDAHO AND WYOMING Ph.D. Thesis
Nicholas Brugger Woodward 1981 401 p
Avail: Univ. Microfilms Order No. 8205142

The local and two regional balanced sections were prepared across the range and across the northern Absaroka thrust sheet. No 'unbalanceable' features were observed; no truncated folds were present. The folds were flexural-slip with the inflection points within the main body of the thrust sheets being the best pinning points. Palinspastic maps for the area based on the restored balanced sections were prepared. Dissert. Abstr.

N82-33913 Columbia Univ., New York.
MAGNETOSTRATIGRAPHY AND MAGNETIC PROPERTIES OF THE PLIOCENE GLENNS FERRY FORMATION OF SOUTHWEST IDAHO Ph.D. Thesis
Colleen Ann Neville 1981 222 p
Avail: Univ. Microfilms Order No. 8204526

The application of magnetostratigraphic techniques to fine grained terrestrial sedimentary sequences has proved to be a valuable aid to litho-, bio-, and chronostratigraphic correlations. This doctoral study was directed towards developing a magnetostratigraphic record for the Pliocene Glenns Ferry Formation of southwest Idaho, and then utilizing the magnetostratigraphic information to clarify existing controversy concerning the age of both the formation and its three local vertebrate faunas. Because the Glenns Ferry Formation is several million years old, it has witnessed numerous reversals in the Earth's magnetic field. Therefore, it was necessary to ensure that the magnetic directions recorded by the samples were the original directions. In order to comprehend the nature of the magnetization processes active in the sediments and lavas, information was amassed on parameters of the primary and secondary magnetic minerals which generate the nature remanence. Techniques used to identify the magnetic mineralogy included isothermal remanent magnetization, Curie temperatures and X-ray diffraction. Dissert. Abstr.

N82-33914 California Univ., Davis.
GEOLOGY AND EVOLUTION OF THE MAGMATIC ROCKS OF THE VOURINOS OPHIOLITE, NORTHERN GREECE Ph.D. Thesis
Anne Ewing Rassios 1981 708 p
Avail: Univ. Microfilms Order No. DA8205024

Magmatic stratigraphy and structure in an ophiolite complex is described. The integration of these features with chemical studies of the magmatic rocks resulted in a model detailing formation of the magmatic complex. This model requires that one or two parental magmas mix with fractionated liquids from older, partly solidified intrusions or with volatiles introduced by hydrothermal circulation during crystallization. One mechanism proposed to facilitate dike extraction is by influx of hydrothermal fluids which would significantly reduce the viscosity of the system and depress the liquids, accounting for the general lack of phenocrysts in the Vourinos diabase. Implications of this model suggest that diabase compositions of ophiolitic or spreading center assemblages are a function of the depth from which the diabase is extracted. The depth of diabase generation is controlled by the depth of ridgecrest fracturing and affect of hydrothermal circulation. Dissert. Abstr.

N82-33915 Johns Hopkins Univ., Baltimore, Md.
THE COMPARATIVE SEDIMENTOLOGY OF THE BAHAMA TYPE SHELF CARBONATES OF THE MIDDLE ORDOVICIAN ST. PAUL GROUP OF THE CENTRAL APPALACHIANS Ph.D. Thesis
Raymond Weatheral Mitchell, III 1982 510 p
Avail: Univ. Microfilms Order No. DA820512

The lower Middle Ordovician St. Paul Group of Maryland and southern Pennsylvania is a 200 meter thick carbonate platform deposit which consists of the Row Park and New Market Formations. Within the group six facies, defined by suites of sedimentary structures, faunal assemblages, and early diagenetic features, are arraged in a large scale regressive - transgressive sequence as follows: lowermost fenestral micrites - Facies I; skeletal packstones - Facies IA; lower laminated facies - Facies II; stromatolitic facies - Facies III; upper laminated facies - Facies IV; structureless micrites - Facies V. A close comparison of the features of this ancient deposit with descriptions of modern sediments deposited on the tidal flats of northwest Andros Island and in the surrounding subtidal areas of the Bahama Banks indicate that the St. Paul Group was deposited in a similar setting i.e. a low 'energy,' rainy environment. Dissert. Abstr.

N82-33916 Columbia Univ., New York.
THE MARINE GEOLOGY OF THE BAHAMA ESCARPMENT Ph.D. Thesis
Raymond Paul Freeman-Lynde 1981 292 p
Avail: Univ. Microfilms Order No. 8204483

A stratigraphic section (2050 to 3960 m) of the Bahama Escarpment off Cat island, measured with DSRV A/vin, consists of lower and Middle Cretaceous peritidal, lagoonal, patchreef and backreef limestones unconformably overlain by an intermittent cover of lithified Maastrichtian and Eocene pelagic linestone above 2540 m. Additional dive traverses and dredging elsewhere indicate that sequences similar in age and lithology to the Cat Island section occur along the entire 800 km of escarpment southeast of Cat Island. Reef and forereef debris which constituted the original Bahama Escarpment is absent due to erosion, and the present Bahama Escarpment is therefore an erosional feature. Erosion occurs intermittently (pre-Maastrichtian, Paleocence and Oligocene erosional events) as recorded by the unconformable forereef and pelagic cover. Erosion of the lower escarpment is effected at present by spallation of joint blocks. Jointing may result from (1) lithostatic pressure at four or five km depth exceeding the strength of the linestone comprising the platform, or (2) decompression of previously deeply buried following exposure on the seafloor. Dissert. Abstr.

N82-33917 Columbia Univ., New York.
GEOLOGIC EVOLUTION OF THE CORDILLERA DARWIN OROGENIC CORE COMPLEX, SOUTHERN ANDES Ph.D. Thesis
Eric Paul Nelson 1981 256 p
Avail: Univ. Microfilms Order No. DA820452

Located in the east-west trending Andes of Tierra del Fuego is a structural culmination exposing deeper crustal levels than in surrounding areas, termed an orogenic core complex because of the localization there of relatively high-grade metamorphism, intense polyphase deformation, and differential uplift. Strongly deformed and regionally metamorphosed pre-Late Jurassic basement rocks mainly of sedimentary origin are unconformably overlain by a cover sequence of Upper Jurassic silicic-intermediate volcanic rocks (Tobifera Formation) and Lower Cretaceous clastic sedimentary rocks (Yahgan Formation). The D1 and D2 phases produced major and minor fold structures, extension and intersection lineations, and axial planar and transposition foliations in complex patterns similar to those in other collision-type orogens. The Darwin and Beagle suites show affinities with S- and I-type granitic suites respectively. Dissert. Abstr.

N82-33918*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A TUTORIAL SOLUTION TO SCATTERING OF RADIATION IN A THIN ATMOSPHERE BOUNDED BELOW BY A DIFFUSELY REFLECTING, ABSORBING SURFACE
James J. Buglia Sep. 1982 29 p refs
(NASA-TP-2077; L-15432; NAS 1.60:2077) Avail: NTIS HC A03/MF A01 CSCL 04A

A simple tutorial method, based on a photon tracking procedure, is described to determine the spherical albedo for a thin atmosphere overlying a reflecting surface. This procedure is used to provide a physical structure with which to interpret the more detailed but highly mathematical analyses presented. The final equations are shown to be in good numerical agreement with more exact solutions for thin atmospheres. S.L.

N82-33919*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
DENSITY MEASUREMENT IN AIR WITH SATURABLE ABSORBING SEED GAS Final Report, 1 Jul. 1980 - 1 Jul. 1981
Donald Baganoff Sep. 1982 9 p refs
(Grant NAG2-36)
(NASA-CR-169420; NAS 1.26:169420) Avail: NTIS HC A02/MF A01 CSCL 04A

Approaches which have the potential to make density measurements in a compressible flow, where one or more laser beams are used as probes, were investigated. Saturation in sulfur hexafluoride iodine and a crossed beam technique where one beam acts as a saturating beam and the other is at low intensity and acts as a probe beam are considered. It is shown that a balance between an increase in fluorescence intensity with increasing pressure from line broadening and the normal decrease in intensity with increasing pressure from quenching can be used to develop a linear relation between fluorescence intensity and number density and lead to a new density measurement scheme. The method is used to obtain a density image of the cross section of an iodine seeded underexpanded supersonic jet of nitrogen, by illuminating the cross section by a sheet of laser light. E.A.K.

N82-33920*# Wyoming Univ., Laramie.
MEASUREMENT OF TROPOSPHERIC CARBONYL SULFIDE BY MICROWAVE SPECTROMETRY Final Report
D. J. Hofmann and E. A. Rinehart 10 Dec. 1981 13 p
(Grant NAG2-33)
(NASA-CR-169417; NAS 1.26:169417) Avail: NTIS HC A02/MF A01 CSCL 04A

Microwave rotational spectrometry is used to measure tropospheric carbonyl sulfide. The instrument and techniques for using it are described. S.L.

N82-33921# Franklin Research Center, Elverson, Pa.
TMA CHEMICAL RELEASE PAYLOADS FOR STRATOSPHERIC WIND MEASUREMENTS AURORAL E PROGRAM AND RELATED PROGRAMS Final Report, 15 Apr. 1980 - 31 Jan. 1982
Charles S. Stokes, William J. Murphy, and Alan D. Kershner Hanscom AFB, Mass. AFGL 15 Mar. 1982 8 p
(Contract F19628-80-C-0022; AF Proj. 2310)
(AD-A115832; AFGL-TR-82-0118) Avail: NTIS HC A02/MF A01 CSCL 22/2

This report covers the work performed in support of the release of the methyls aluminum as a trail in the upper atmosphere via a sounding rocket. The payload was launched from Poker Flat Research Range of the University of Alaska at Fairbanks, Alaska during March of 1981. The operation included design, fabrication, assembly and launch services of the chemical payload together with the refurbishment of several other chemical payloads.
Author (GRA)

N82-33922# Naval Research Lab., Washington, D. C. Geophysical and Plasma Dynamics Branch.
ELECTRON VELOCITY SHEAR INSTABILITY IN THE AURORAL IONOSPHERE Interim Report
M. J. Keskinen and J. D. Huba 25 Jun. 1982 38 p refs
(RR0330244)
(AD-A116848; NRL-MR-4839) Avail: NTIS HC A03/MF A01 CSCL 08/14

A linear electrostatic kinetic theory of velocity sheared electron streams flowing parallel to the geomagnetic field is presented. Our development, which includes the effects of density gradients, background ions and electron collisions, is valid for arbitrary T sub e/T sub i, where T sub e and T sub i are the electron and ion temperatures, respectively. For applications to the auroral ionosphere, we find that the interface between downward flowing hot electrons and upward flowing return current cold electrons, commonly seen near auroral arcs, is unstable to a high frequency electron velocity shear driven instability. The mode is characterized by gamma less than or = .001 omega pe and r sub Li > k to the -1 power > r sub Le, where gamma is the growth rate, omega pe is the electron plasma frequency, k is the wavenumber, and r sub L alpha is the mean Larmor radius of species alpha. In the nonlinear regime, it is anticipated that this instability can evolve into a vortex configuration and as a result, can act as a block near the edges of the electron flow. Author (GRA)

N82-33923# Naval Research Lab., Washington, D. C. Ionospheric Diagnostics Section.
AN ATLAS OF IONOSPHERIC F-REGION STRUCTURES AS DETERMINED BY THE NRL-747/S3-4 IONOSPHERIC IRREGULARITIES SATELLITE INVESTIGATION Interim Report
E. P. Szuszczewicz, J. C. Holmes, D. N. Walker, M. Singh (Sachs/Freeman Assoc., Inc.), P. Rodriguez, M. Swinney, and L. Kegley 7 Jul. 1982 340 p refs
(RR0330244)
(AD-A117269; NRL-MR-4862) Avail: NTIS HC A15/MF A01 CSCL 04/1

The Naval Research Laboratory in collaboration with the Air Force Space Test Program and the Office of Naval Research conducted an 'in situ' ionospheric irregularities investigation using pulsed-plasma-probe instrumentation on the polar-orbiting STP/S3-4 satellite. The polar orbit made possible a global study of F-region ionospheric electron densities Ne, temperature Te, irregularity structures delta Ne and associated power spectral distributions Pn(k). The data provide a fundamental base upon which to catalogue similarities and differences between polar and equatorial irregularities and ultimately sort out casual mechanisms coupling plasma instabilities, ionospheric irregularities, and associated effects on communication and surveillance systems. In this report the experimental techniques is briefly described, associated data sets outlined, and a complete catalogue of ionospheric density profiles is presented covering over 600 orbits of data during the period March-September 1978. Author (GRA)

N82-33924# Naval Weapons Center, China Lake, Calif. Ordnance Systems Dept.
OVERVIEW OF THE AEROTHERMAL ENVIRONMENT OF AIR-LAUNCHED MISSILES
B. M. Ryan Dec. 1981 65 p refs
(WF32300000)
(AD-A116799; NWC-TP-6292) Avail: NTIS HC A04/MF A01 CSCL 04/1

The aerothermal environment of a weapon system begins with the storage and preflight conditions which determine the initial flight temperatures and influence the captive-carry temperature response of the missile. The performance capability of the carrying aircraft and the operational techniques and mission profiles required by current tactics define the captive flight thermal environment. All these factors determine the temperature distribution of the missile at launch, which becomes the initial condition for calculating the temperature response during the free-flight trajectory. The missile configuration affects the temperature response during all phases of flight. Fundamental to the determination of these temperatures is the effect of meteorological and climatic conditions due to the atmospheric temperature distribution which changes substantially as a result of seasonal and geographic effects as well as altitude. The high Mach numbers and extended flight times of the modern high-performance carrying aircraft and of current

and proposed highly sophisticated advanced missile systems make detailed consideration and understanding of these effects essential. This report presents an overview of these environmental factors as they are currently understood and employed at the Naval Weapons Center. Also discussed are problem areas and knowledge gaps, particularly in the free-flight environment. GRA

N82-33925# Naval Weapons Center, China Lake, Calif. Public Works Dept.
ATMOSPHERIC VISIBILITY MEASUREMENTS AT CHINA LAKE: A 5-YEAR NEPHELOMETRY SUMMARY Summary Report, Oct. 1975 - Sep. 1980
A. Raymond Kelso Jul. 1981 40 p refs
(AD-A116794; NWC-TP-6205) Avail: NTIS HC A03/MF A01 CSCL 06/16

Visibility impairment directly affects the performance of optical data gathering instrumentation used at the Naval Weapons Center, China Lake, Calif. As weapons systems become more complex, test requirements push optical instrumentation systems to their limits. Any increased visibility degradation poses a serious problem for operations on NWC's ranges. In response to the interest in visibility, a monitoring program was initiated in 1975 to provide baseline nephelometry data and to establish usable theoretical relationships between light, eye, and the atmosphere that would permit calculations of visual range. A brief discussion is given of the atmosphere's ability to attenuate light, and the meteorological conditions that contribute to the concentration of suspended aerosols in the China Lake area are discussed. Analysis of the 5-year data base indicates that significant variations in visibility occur on an annual, seasonal, and diurnal basis. These data are presented in graphical form indicating periods of highest and lowest visibilities. Author (GRA)

N82-33926# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
NATURAL PROCESSES INFLUENCING TERRAIN ATTRIBUTES. REPORT 1: PREDICTION OF RESIDUAL SOIL TEXTURE IN HUMID TEMPERATURE CLIMATES OF THE FEDERAL REPUBLIC OF GERMANY AND SELECTED ANALOGOUS PORTIONS OF THE UNITED STATES, PILOT STUDY
William K. Dornbusch, Jr. Jun. 1982 154 p refs
(DA Proj. 4A1-61102-AT-24)
(AD-A116939; WES/MP/GL-82-2) Avail: NTIS HC A08/MF A01 CSCL 08/13

To develop a methodology for predicting soil texture, an intensive literature review was made of the interrelations among genetic factors, natural and cultural processes, and soil formations, and a considerable quantity of pertinent data from the field and literature was collected for the Federal Republic of Germany and the eastern United States. The literature was summarized and the data shown. A total of 1309 soil profiles were examined. Every profile was classified in Unified Soil Classification System terms and 1285 of these were also classified in U.S. Department of Agriculture terms. Each profile consisted of two soil samples, one from the 0- to 6-in. depth and the other from the 6- to 12-in. depth. The soils data were shown in tabular and graphic form representing the occurrence of soil types for given rock types (residual soils) and soil types in glacial and aeolian deposits, respectively. A tabular breakdown of soil types according to slope classes also was shown. The significant findings of the literature review and the soil-rock data were synthesized to evolve the subject methodology. Author (GRA)

N82-33927# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
NEW PRESSURE TEST FOR DETERMINING COEFFICIENT OF PERMEABILITY OF ROCK MASSES Final Report
Robert D. Bennett and Robert F. Anderson Jul. 1982 65 p refs
(AD-A116982; WES/TR/GL-82-3) Avail: NTIS HC A04/MF A01 CSCL 13/2

New borehole pressure injection test equipment for determining the coefficient of permeability has been developed that has several improvements over equipment now in common use. This report describes the major components of the new test equipment and the improvements made to both equipment and test procedures for reliable operation and accurate test results. Methods of reporting, analyzing and interpreting results are also presented. Author (GRA)

N82-33928# Army Engineer Topographic Labs., Fort Belvoir, Va.
RAY TRACING METHODS FOR CALCULATION OF ATMOSPHERIC REFRACTION
Eugene A. Margerum 30 Jun. 1982 17 p refs
(AD-A116766; ETL-R036) Avail: NTIS HC A02/MF A01 CSCL 12/1

Equations for tracing rays through an atmospheric medium of continuously variable refractive index are obtained in spherical coordinates from Fermat's principle by applying the Euler equation. By introducing canonical variables they are reduced to a set of first order differential equations in normal form, suitable for stepwise numerical integration. Altitude and azimuth angles are introduced and a transformation is derived for determining the refraction errors, including lateral refraction, from the integrated results. The spherically symmetrical case is considered in more detail and leads to an equation for the error in altitude angle expressible as a quadrature over the radial coordinate. A perturbation formula for obtaining the part of the refraction error due to differences between an actual atmospheric profile and some standard atmospheric profile is derived by taking the functional (or variational) derivative. The resulting integral over the radial coordinate has a particularly simple form. Author (GRA)

N82-33929# Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
ESTIMATES OF CRUSTAL TRANSMISSION LOSSES USING MLM ARRAY PROCESSING Thesis
Edward Kurt Scheer Jul. 1982 100 p refs Prepared in cooperation with Woods Hole Oceanographic Inst.
(Contract N00014-75-C-0852)
(AD-A117278; WHOI-82-31) Avail: NTIS HC A05/MF A01 CSCL 08/11

The MLM data adaptive array processor, as an estimator of the frequency/wavenumber function of a multidimensional random process, is used to determine crustal transmission losses. Results obtained with a set of seismic refraction data from the ROSE experiment are presented. A method, implemented in the TL determination, for correcting errors in the amplitude of the estimates, due to the MLM bias that occurs when using sparse arrays, is introduced. Author (GRA)

N82-33930# Air Force Office of Scientific Research, Bolling AFB, Washington, D.C. Directorate of Chemical and Atmospheric Sciences.
THE 26TH AFOSR CHEMICAL AND ATMOSPHERIC SCIENCES PROGRAM REVIEW FY81
William G. Thorpe, ed., Lee E. Myers, ed., and Sylvia A. Stallings, ed. 1 Mar. 1982 175 p refs
(AF Proj. 2303; AF Proj. 2310)
(AD-A117325; AFOSR-82-0197TR) Avail: NTIS HC A08/MF A01 CSCL 05/1

A review is presented of research efforts sponsored by the Directorate of Chemical and Atmospheric Sciences which have completed their period of support. Illustrated accounts resulting from the basic research programs in the Atmospheric and Chemical Sciences are highlighted. The Atmospheric Sciences is concerned with meteorology and upper atmospheric structure and dynamics. The meteorology focuses on mesoscale meteorology, cloud physics, and atmospheric dynamics. The Chemical Sciences deal with Chemical Techniques, Chemical Structures, Surface Chemistry, Chemical Dynamics, and Synthesis and properties of Materials. Author (GRA)

N82-33931# Princeton Univ., N. J. Dept. of Statistics.
PLATONIC PLATE TECTONICS: ON THE REGULARITY OF THE DISTRIBUTION OF TRIPLE POINTS ON THE EARTH'S SURFACE

Anthony J. Arnold (Harvard Univ.) and Andrew F. Siegel Nov. 1981 13 p refs
(Contract DAAG29-79-C-0205)
(AD-A113777; TR-216-SER-2; ARO-16669.16-M) Avail: NTIS HC A02/MF A01 CSCL 08/7

The geometry of the division of the Earth's surface by the major tectonic plates is remarkably regular and symmetric, and several models based on the platonic solids have been proposed to describe this pattern. Under such a model, the triple points, those points at the boundary of three plates, will have an exceptionally regular distribution. We have tested the distribution of the major triple points using a Monte Carlo computational approach and found it to depart significantly from random, independent and uniform placement of points. Given the natural human tendency to see patterns in situations where, in reality, only unstructured randomness actually exists, the formal testing of hypotheses helps to conform the validity of these structural geologic models. Author (GRA)

N82-33932# Systems Science and Software, La Jolla, Calif.
THREE-DIMENSIONAL VELOCITY STRUCTURE OF THE CRUST AND UPPER MANTLE BENEATH THE NEVADA TEST SITE Final Report, 1 Apr. 1980 - 31 Mar. 1981
John M. Savino, J. B. Minster, W. L. Rodi, T. H. Jordan, and J. F. Masso Aug. 1981 228 p refs
(Contract F49620-80-C-0070; ARPA Order 3291; AF Proj. 2309)
(AD-A114241; SSS-R-81-5138; AFOSR-82-0351TR) Avail: NTIS HC A11/MF A01 CSCL 08/11

We have constructed a model of the three dimensional velocity structure in the crust and upper mantle beneath NTS. This model was obtained by inversion of teleseismic travel times from NTS explosions reported for a set of globally distributed seismograph stations. Although the geometry is conceptually the reciprocal of the classical geometry involving a localized network and distributed teleseismic sources, several important differences emerge. In particular, the data are contaminated by different error processes, and different correction terms need be applied to the raw travel time data. We present algorithms which take advantage of the large number of raw data initially available to improve to some extent the signal-to-noise ratio, and lead to a reduction of the inverse problem to computationally manageable size. In addition, we show how projection operators can be used to formulate an equivalent inverse problem with smaller dimensions which is insensitive to unknown baseline corrections and similar nuisance parameters. Finally, we develop an algorithm which permits further reduction in problem size by grouping redundant data with minimal loss of information and with further noise reduction. GRA

N82-33933# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
METHODS AND TECHNIQUES OF EXPERIMENTAL RESEARCH ON THE ATMOSPHERE (SELECTED ARTICLES)
R. I. Bogdanov, A. A. Vorontsov, Yu. A. Glaglev, B. P. Zaychikov, M. V. Krechmer, G. P. Kalduzov, A. F. Kusenkov, V. I. Kuzmicheva, and V. I. Shlyakhov 18 Jun. 1982 56 p refs Transl. into ENGLISH from Tr. Tsent. Aerol. Obs., Met. Tekh. Eksperim. Issled. Atm. (USSR), no. 102, 1971 p 3-23, 139-140
(AD-A117570; FTD-ID(RS)T-0782-82) Avail: NTIS HC A04/MF A01 CSCL 04/2

Data acquisition, Experimental data, Meteorological data, Accuracy, Research management, Atmospheres, Foreign technology, USSR, Translations Methods and Techniques of Experimental Research on the Atmosphere. GRA

N82-33934# Institute of Oceanographic Sciences, Birkenhead (England).
HIGH PRECISION TIDAL GRAVITY Final Report, 1 Apr. 1980 - 31 Mar. 1982
T. F. Baker, R. J. Edge, and G. Jeffries 15 May 1982 20 p refs
(Grant AF-AFOSR-0168-80; AF Proj. 2309)
(AD-A116941; AFGL-TR-82-0163) Avail: NTIS HC A02/MF A01 CSCL 08/5

The progress made during the second year of the programme is described. The 3 gravimeter conversions and systems construction are nearly complete. A six month tidal gravity experiment was undertaken using E.T.1o. and preliminary results from this experiment are described. Calculations of Indian Ocean tidal loading at various sites around the ocean have been made and from these results, together with a visit to India and Pakistan, initial sites for the primary observation programme have been selected. In addition a tidal prediction software package is described which will have a wide range of applications in geodynamics measurements which require tidal corrections accurate to + or - 0.5 cm or + or - 1 microgal. Author (GRA)

N82-33935# Naval Research Lab., Washington, D. C.
A SURVEY OF IONOSPHERIC MODELS: A PRELIMINARY REPORT ON THE DEVELOPMENT OF AN IONOSPHERIC MODEL THESAURUS AND USERS GUIDE Interim Report
J. M. Goodman and E. O. Hulburt 13 Jul. 1982 62 p refs
(AD-A117659; NRL-MR-4830) Avail: NTIS HC A04/MF A01 CSCL 04/1

This manuscript constitutes an interim progress report on an effort begun in early 1981 to compile a thesaurus and users guide for various ionospheric models which are used to assist in analysis of the radiowave propagation medium. The current status of the effort is given and future plans are outlined. Author (GRA)

N82-33936# Naval Ocean Systems Center, San Diego, Calif. EM Propagation Div.
DEVELOPMENT OF A MINICOMPUTER ATMOSPHERIC NOISE MODEL Technical Progress Report, Jan. - Sep. 1981
D. B. Sailors and R. P. Brown 1 May 1982 107 p refs
(AD-A117851; NOSC/TR-778) Avail: NTIS HC A06/MF A01 CSCL 04/1

A practical but simplified atmospheric noise model for use in estimating system signal-to-noise ratios in micro-mini-computer based HF propagation prediction systems is presented. Numerical mapping techniques were used to represent worldwide atmospheric noise at 1 MHz in 24 numerical maps: one for each of six 4-hour time blocks (in universal time) and each of four 3-month periods. This representation results in a minimum reduction by one-fifth in the number of coefficients necessary in computer memory over that of an earlier model in which the map represented an entire twenty-four hour day. Author (GRA)

N82-33937# Naval Research Lab., Washington, D. C.
EFFECT OF AN ELECTRON BEAM ON THE CURRENT CONVECTIVE INSTABILITY
P. K. Chaturvedi and S. L. Ossakow 23 Jul. 1982 18 p refs Sponsored in part by Defense Nuclear Agency
(RR03302244)
(AD-A117908; NRL-MR-4858) Avail: NTIS HC A02/MF A01 CSCL 04/1

The possible effects of an electron beam on the current convective instability in a weakly ionized plasma, with application to the diffuse auroral-like situation are considered. A linear instability analysis including these effects is presented. Author

N82-33938# Observatorio del Ebro, Tortosa (Spain). Ionospheric Section.
LUNAR VARIATION OF SEVERAL IONOSPHERIC PARAMETERS
L. F. Alberca, J. O. Cardus, and E. Galdon 30 Sep. 1981 35 p refs
(Grant AF-AFOSR-0114-79)
(AD-A117689; SR-2; EOARD-TR-82-12) Avail: NTIS HC A03/MF A01 CSCL 04/1

The first four harmonics of the diurnal lunar variation and the semimonthly lunar tide of two years TEC data at Ebro and at Hamilton, and for some other ionospheric parameters at Ebro were obtained. For the parameters with sufficient number of data, the lunar harmonics for the different seasons were also obtained. The relation between the diurnal lunar variation of the height and the electron density of the maximum of the F2 layer seems to be solar dependent with a change of the phase at about 1000 SLT.

The diurnal solar variation of the semimonthly lunar tide is also discussed. Author

N82-33939# Sandia Labs., Albuquerque, N. Mex.
NUMERICAL ANALYSIS OF HYDRAULICALLY-DRIVEN FRACTURES
Robert H. Nilson and Stewart K. Griffiths Apr. 1982 33 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015501; SAND-81-2618) Avail: NTIS HC A03/MF A01

A general method of lines numerical approach for modeling hydraulically driven fractures was developed. The methodology employs several novel features: a straining coordinate system that elongates as the fracture grows, an evolutionary equation to describe growth of the fracture length, direct treatment of the fluid/elastic-solid coupling, and a control volume equation which governs fluid motion near the tip and thus circumvents local degeneracy of the differential equations. Spacial discretization of the governing equations leads to a nonsparse system of implicit, coupled ordinary differential equations that is solved for time derivatives that are then integrated with a Runge-Kutta algorithm. The numerical solutions agree very well with known simularity solutions for laminar and for turbulent flow. New solutions for nonsimilar flows are also presented. DOE

N82-33940# Foundation Sciences, Inc., Portland, Oreg.
FIELD AND IN-SITU ROCK-MECHANICS TESTING MANUAL
Frank S. Shuri, Michael L. Feves, Gary L. Peterson, Kevin M. Foster, and Clive F. Kiele, Jr. Oct. 1981 214 p
(Contract DE-AC06-76RL-01830)
(DE82-015762; ONWI-310) Avail: NTIS HC A10/MF A01

Standardized field and in situ rock mechanics testing procedures for use in the National Terminal Waste Storage Program were prepared. Equipment performance specifications, documentation and reporting, and Quality Assurance acceptance criteria are compared. The procedures incorporate existing standards represent the current state of the art. Maximum flexibility in equipment design is incorporated to allow use of this manual by existing groups and to encourage future improvements. DOE

N82-33941# Texas Univ., Austin. Bureau of Economic Geology.
CALDERAS AND MINERALIZATION: VOLCANIC GEOLOGY AND MINERALIZATION IN THE CHIANTI CALDERA COMPLEX, TRANS-PECOS TEXAS
Timothy W. Duex and Christopher D. Henry 1981 15 p refs Sponsored in part by the Texas Mining and Mineral Resources Research Inst.
(Contracts DE-AC13-76GJ-01664; E(05-1)-1664)
(DE82-013263; DOE/GJ-01664/T3; GC-81-2) Avail: NTIS HC A02/MF A01

Preliminary results are described of an ongoing study of the volcanic stratigraphy, caldera activity, and known and potential mineralization of the Chinati Mountains area of Trans-Pecos Texas. Many ore deposits are spatially associated with calderas and other volcanic centers. A genetic relationship between calderas and base and precious metal mineralization has been proposed by some and denied by others. Steven and others have demonstrated that calderas provide an important setting for mineralization in the San Juan volcanic field of Colorado. Mineralization is not found in all calderas but is apparently restricted to calderas that had complex, postsubsidence igneous activity. A comparison of volcanic setting, volcanic history, caldera evolution, and evidence of mineralization in Trans-Pecos to those of the San Juan volcanic field, a major mineral producer, indicates that Trans-Pecos Texas also could be an important mineralized region. The Chianti caldera complex in Trans-Pecos Texas contains at least two calderas that have had considerable postsubsidence activity and that display large areas of hydrothermal alteration and mineralization. DOE

N82-33942# Sandia Labs., Albuquerque, N. Mex. Instrumentation Applications Div.
SEAFLOOR EARTHQUAKE MEASUREMENT SYSTEM. VOLUME 2: ELECTRONIC HARDWARE DESCRIPTION
David E. Ryerson Dec. 1981 69 p
(Contract DE-AC02-76DP-00789)
(DE82-009319; SAND-81-1810/2) Avail: NTIS HC A04/MF A01

The Seafloor Earthquake Measurement System, a unique instrument for collecting seismic motion data from remote ocean floor sites is described. The electronic systems of the data gathering and the command units are described, as well as the acoustic telemetry systems which provide the communication link. DOE

N82-33943# Geological Survey, Menlo Park, Calif.
DESCRIPTION OF A MAGNETIC TAPE CONTAINING THE PRINCIPAL FACTS OF APPROXIMATELY 64000 GRAVITY STATIONS IN THE STATE OF CALIFORNIA Final Report
David B. Snyder, Carter W. Roberts, Richard W. Saltus, and Robert F. Sikora Feb. 1981 38 p refs
(PB82-168279; USGS-GD-82-0022; DOI/DF-82-001A) Avail: NTIS HC A03/MF A01 CSCL 08E

The principal facts of 64,026 gravity stations within the State of California are contained on the 9-track magnetic tape. Tape blocksize is 8000 with logical record lengths of eighty ASCII characters written at 1600 bpi density. The tape contains a leading explanatory file followed by 28 data files arranged by 1 degree by 2 degree sheets. The International Gravity Formula of 1930 is used. Airy-Heiskanen isostatic anomalies are included, computed for an average crustal thickness of 25 km, density of topography 2.67 g/cc and a lower crust-upper mantle density of 0.4 g/cc, in addition to complete Bouguer anomalies reduced at a density of 2.67 g/cc. Terrain corrections extend to 166.7 km from each station. GRA

N82-33944# Smithsonian Astrophysical Observatory, Cambridge, Mass.
INVESTIGATE THE TIME EVOLUTION OF THE CORRELATION BETWEEN BATHYMETRY AND GEOID HEIGHT IN THE PACIFIC OCEAN Final Report, Jul. 1979 - Jul. 1981
Micheline C. Roufosse Nov. 1981 15 p Sponsored by NOAA
(PB82-172099; NOAA-82012008) Avail: NTIS HC A02/MF A01 CSCL 08E

SEASAT radar altimeter data was organized and catalogued by increasing revolution number. The Hawaiian region in the Pacific Ocean was chosen as a test area. The method used to explain the shape and intensity of the geoid signal is summarized. The lithosphere is considered as a thin elastic plate which deforms when it is loaded by bathymetric features such as seamounts. The study of the correlation existing between the geoid heights and the bathymetry yields information on the mechanical properties of the plate. These mechanical properties are dependent upon the thickness and thus the age of the lithosphere. The bathymetry was constructed from contour maps along the subsatellite position and then convolved with the filters in order to predict a series of geoid height profiles. The calculated profile which best reproduces the observed geoid height profile derived from the SEASAT radar altimeter is chosen as representative of the region. The study was restricted to linear bathymetric features such as island or seamount chains and ridges. GRA

N82-33945# Science Applications, Inc., San Diego, Calif.
AVHRR MEASUREMENTS OF ATMOSPHERIC AEROSOLS OVER OCEANS Final Report
M. Griggs Nov. 1981 61 p refs
(Contract MO-A01-78-00-4092)
(PB82-172115; NOAA-81012003; SAI-131-81-343LJ) Avail: NTIS HC A04/MF A01 CSCL 04A

A large set of AVHRR and ground-truth data was obtained at ten sites around the globe to investigate the possible global variability of the radiance-aerosol content relationship observed previously with LANDSAT data. The aerosol content was inferred from the AVHRR Channel 1 radiance using an algorithm based on previous LANDSAT measurements at San Diego. The data for four sites were analyzed, and showed excellent agreement between the aerosol content measured by the AVHRR and by sunphotometers at San Diego, Sable Island and San Juan, but at Barbados, the AVHRR appeared to overestimate the aerosol content. The

reason for the different relationship at the Barbados site was not definitely established, but is most likely related to problems in interpreting the sunphotometer data rather than to a real overestimation by the AVHRR. GRA

N82-33563# De (Sasadhar), West Bengal (India).
SEISMIC WAVES
Sasadhar De *In* Shock and Vibration Inform. Center The Shock and Vibration Digest Jan. 1982 p 17-33 refs (For primary document see N82-33561 24-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 08/11

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-33946*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE GEOLOGIC RECORD OF CLIMATIC CHANGE
Thomas J. Crowley Jun. 1982 154 p refs
(NASA-TM-83956; NAS 1.15:83956) Avail: NTIS HC A08/MF A01 CSCL 04B

Major results from paleoclimatic investigations are investigated, and background material is included. The time interval surveyed extends from the formation of the Earth 4.6 billion years ago to the development of the instrumental record. Author

N82-33947*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE MULTI-PARAMETER REMOTE MEASUREMENT OF RAINFALL
David Atlas, Carlton W. Ulbrich (Clemson Univ.), and Robert Meneghini Jul. 1982 134 p refs Presented at the Conf. on Multiple Parameter Radar Measurements of Precipitation, Bournemouth, England, 23-27 Aug. 1982 Submitted for publication Sponsored in part by Commission F of the International Scientific Radio Union
(Grant NAG5-232)
(NASA-TM-83971, NAS 1.15:83971) Avail: NTIS HC A07/MF A01 CSCL 04B

The measurement of rainfall by remote sensors is investigated. One parameter radar rainfall measurement is limited because both reflectivity and rain rate are dependent on at least two parameters of the drop size distribution (DSD), i.e., representative raindrop size and number concentration. A generalized rain parameter diagram is developed which includes a third distribution parameter, the breadth of the DSD, to better specify rain rate and all possible remote variables. Simulations show the improvement in accuracy attainable through the use of combinations of two and three remote measurables. The spectrum of remote measurables is reviewed. These include path integrated techniques of radiometry and of microwave and optical attenuation. S.L.

N82-33948*# Wyoming Univ., Laramie. Dept. of Atmospheric Science.
ICE FORMING EXPERIMENT Final Report, 1976 - 1981
Gabor Vali 30 Jul. 1982 74 p refs
(Contract NAS8-33150)
(NASA-CR-170623; NAS 1.26:170623) Avail: NTIS HC A04/MF A01 CSCL 04B

A low gravity experiment to assess the effect of the presence of supercooled cloud droplets on the diffusional growth rate of ice crystals is described. The theoretical work and the feasibility studies are summarized. The nucleation of ice crystals in supercooled clouds is also discussed. S.L.

N82-33949# Naval Postgraduate School, Monterey, Calif.
MARINE ATMOSPHERIC BOUNDARY LAYER AND INVERSION FORECAST MODEL M.S. Thesis
David Almy Brower Mar. 1982 137 p refs
(AD-A115769) Avail: NTIS HC A07/MF A01 CSCL 04/2

A computer code for prediction of the marine atmospheric boundary layer is developed. The code is used to predict changes of the capping inversion height, the strength of the specific humidity and potential temperature 'jumps' at the inversion, the well-mixed relative humidity in the layer and the lifting condensation level for possible cloud/fog formation. The code is based on recently formulated integrated models for the clear or cloudy marine. Planetary boundary layer capped by an inversion. The initialization is based on radiosonde data and, as such, the code was developed to be used with the Integrated Refractive Effects Prediction System (IREPS) assessment Code. It has been extended to be used with any single platform having atmospheric sensing capabilities, radiosonde or dropsonde. IREPS and hence the MABL prediction code are under consideration for inclusion in Tactical Environmental Support System (TESS). Author (GRA)

N82-33950# Sonicraft, Inc., Chicago, Ill.
THE ROLE OF METEOROLOGICAL SATELLITES IN TACTICAL BATTLEFIELD WEATHER SUPPORT Final Report, 23 Jun. 1981 - 28 Feb. 1982
Thomas O. Haig 17 Mar. 1982 242 p refs
(Contract F19628-81-C-0104; AF Proj. 2688)
(AD-A116936; AFGL-TR-82-0124) Avail: NTIS HC A11/MF A01 CSCL 04/2

The requirements for tactical battlefield weather support are examined and the critical area of mesoscale analysis and prediction is identified. Ground data processing techniques and personnel training requirements are assessed as well as current and proposed meteorological satellite sensors and systems. The minimum requirements for the battlefield weather observing and forecasting system are established. Report is fully documented and extensive reference list is included. Author (GRA)

N82-33951# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Hydraulics Lab.
ATLANTIC COAST WATER-LEVEL CLIMATE Final Report
Bruce A. Ebersole Apr. 1982 499 p refs
(AD-A117147; WIS-7) Avail: NTIS HC A21/MF A01 CSCL 08/3

The U. S. Atlantic coast water level climate, developed for the Wave Information Study (WIS), is comprised of the following products at each of 20 locations along the coast: (a) trends and variability in mean sea level; (b) magnitudes of the expected water-level climate via estimated probability density and cumulative distribution functions for astronomical tide, storm surge, and total water level; (c) duration statistics for both storm surge and water level; and (d) extremal storm surge information as a result of extratropical storms. The nature of the water level data, the analysis procedures used, and the interpretation of the results are included. Author (GRA)

N82-33952# Army Engineer Topographic Labs., Fort Belvoir, Va.
A GENERAL CLIMATOLOGICAL GUIDE TO DAILY FREEZING CONDITIONS: FROST DAYS, ICE DAYS AND FREEZE-THAW DAYS Final Report, Jul. 1978 - Jul. 1980
Ruth L. Wexler Apr. 1982 52 p refs
(DA Proj. 4A6-161102-AT-24)
(AD-A116771; ETL-0287) Avail: NTIS HC A04/MF A01 CSCL 04/2

Climatological information concerning daily freezing conditions is of considerable interest to military and civilian communities because of the impact of such conditions on traffic mobility, personnel performance, and equipment function. In support of strategic planning, this report presents a series of maps showing the geographical distributions of the annual incidence of frost days, ice days, and freeze-thaw days, respectively, over an extensive area of the Northern Hemisphere (Europe and U.S.S.R.). In addition, a number of simple climatological guides are provided whereby the above parameters, if required, might be conveniently derived from ordinarily available data, either for a given area or a single station. GRA

N82-33953# Army Missile Command, Redstone Arsenal, Ala. Research Directorate.

TURBULENCE ANALYSIS BY USE OF THE FAST FOURIER TRANSFORM
Oskar M. Essenwanger 24 Sep. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117157) Avail: NTIS HC A02/MF A01 CSCL 04/1

Fast Fourier transform is a useful tool in turbulence analysis and the lack of canned programs of the Fourier transform of the autocorrelation function poses no serious problem. There are however differences between the spectra produced by these two techniques. A data sample procured with the Gill anemometer recorded at one second time intervals reflect agreement with the turbulence hypothesis. The FFT has the advantage that turbulence data can be readily expressed as a Fourier series. The amplitude relationship is expressed by equations while the phase angles are randomly distributed. Although a set phase angles can be constructed from random generators in electronic data processing, a simple technique would be a substitution from a set of empirical turbulence data. Example of analytically produced nonstationary set of data which could be superimposed on the stationary wind profile is given. These inferred data sets can be established where special tower measurement are not available such as for altitudes beyond tower measurements and/or for geographic locations without lower measurements. GRA

N82-33954# National Weather Service, Silver Spring, Md. Integrated Systems Lab.
AUTOMATED LOW-COST WEATHER OBSERVATION SYSTEM (ALWOS) Final Report
Wayne Huffman and Stephen Imbembo Washington FAA Feb. 1982 164 p refs Sponsored by FAA
(AD-A117447; FAA-RD-82-31) Avail: NTIS HC A08/MF A01 CSCL 04/2

One of the primary objectives of this program was to design a developmental model ALWOS for the lowest possible cost. Reliability and maintenance costs over the life of the system were considered in addition to the initial purchase and installation costs. To this end, field proven, off the shelf components were used wherever possible throughout the system. Another primary objective was modularity of design. The hardware and software were constructed to allow flexibility in interfacing a variety of sensors or adding additional sensors to measure new parameters. The ALWOS as configured at Dulles Airport is a low-cost and flexible system which can provide an automatic weather observation from the data acquisition, processing and display point of view, with the potential for good long-term system reliability. After a period of familiarization with the equipment and dealing with an assortment of system and sensor problems, the functioning of the system became relatively trouble-free. Evaluation of the ALWOS supports the generally accepted concept that automated, low-cost weather observation systems can indeed perform such a function given suitable sensing devices. Author (GRA)

N82-33955# Ben Gurion Univ. of the Negev, Sede Boqer (Israel). Inst. for Desert Research.
A DYNAMICAL MODEL FOR PREDICTION OF FORMATION, GROWTH AND DISSIPATION OF A CLOUD Final Technical Report
Louis Berkofsky 31 May 1982 71 p refs
(Grant DA-ERO-77-G-043)
(AD-A117452) Avail: NTIS HC A04/MF A01 CSCL 04/2

A dynamical model for the prediction of the life cycle of a desert cloud has been developed. The cloud is assumed to be a plume, i.e., to be contained within a cylindrical axi-symmetric volume. Thus, given ambient atmospheric conditions, and appropriate initial and boundary conditions, it is possible to predict the evolution as a function of height of a cloud. In all cases which we tested, the initial and ambient data were such that the life cycle never exceeded a few minutes. This is probably due to the fact that the data were compatible with a dry environment, thus preventing development. It is shown how this model may be interlaced with one for the larger scale circulation, thus providing the possiblity for the prediction of moisture convergence, necessary for cloud formation. Author (GRA)

N82-33956# Washington Univ., Seattle. Cloud and Aerosol Research Group.
CLOUD AND PRECIPITATION PARTICLE SIZE SPECTRA Final Technical Report, 10 Oct. 1978 - 29 Apr. 1982
Peter V. Hobbs Jun. 1982 9 p refs
(Grant DAAG29-79-G-0005)
(AD-A117457; DRXRO-PP-L-15420-GS; ARO-15420.14-GS) Avail: NTIS HC A02/MF A01 CSCL 04/2

Airborne measurements of the size distributions of cloud and precipitation particles in extratropical cyclones are described. Empirical expressions for the particle size distributions, and the effects of ambient conditions on these expressions, are described. The effects of the different size distributions on estimates of radar reflectivity and the mass content of cloud and precipitation particles are discussed. Author

N82-33957# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Applied Research Branch.
SNOWPACK PROFILE ANALYSIS USING EXTRACTED THIN SECTIONS
William L. Harrison May 1982 19 p refs
(DA Proj. 4A7-62730-AT-42)
(AD-A117839; CRREL-SR-82-11) Avail: NTIS HC A02/MF A01 CSCL 04/2

A method is presented for obtaining snow profiles for analysis. The method and required equipment replace former methods such as the 'roaring bonfire' technique and the use of dyes.
Author (GRA)

N82-33958# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Hydraulics Lab.
OBJECTIVE SPECIFICATION OF ATLANTIC OCEAN WIND FIELDS FROM HISTORICAL DATA Final Report
D. T. Resio, C. L. Vincent, and W. D. Corson May 1982 55 p refs
(AD-A117683; WES/WIS-4) Avail: NTIS HC A04/MF A01 CSCL 04/2

An integral part of the Wave Information Study's effort to hindcast 20 years of waves for U.S. coastlines is the reconstruction of surface wind fields from availabie historical meteorological data. This report presents the methodology utilized for the estimation of surface winds from pressure fields, air and sea-surface temperature fields, and observed winds from ships. A critical element in the evaluation of a numerical study such as this is an analysis of the estimated error characteristics of the results. Extensive comparisons between observed and predicted winds are presented in the report. Without exception, these comparisons indicate that the statistical characteristics of the estimated winds provide a close approximation to those of the observed winds.
Author (GRA)

N82-33959# Vitro Labs., Silver Spring, Md.
ENVIRONMENTAL DATA FOR SITES IN THE NATIONAL SOLAR DATA NETWORK
Jan. 1982 120 p
(Contract DE-AC01-79CS-30027)
(DE82-008076; SOLAR/0010-82/01) Avail: NTIS HC A06/MF A01

Environmental data collected at the sites of the National Solar Data Network are tabulated for each solar site. The sites are grouped into 12 zones, each of which consists of several adjacent states. The insolation table presents the total, diffuse, direct, maximum, and extraterrestrial radiation for the solar site. It also shows the ratio of the total to extraterrestrial radiation as a percent. The temperature table gives the average, daytime, nighttime, maximum, minimum and inlet-water temperatures for the solar site. All of the passive and some of the active solar sites are equipped with wind sensors which provide information for two wind tables furnishing wind speed and direction. For some sites, a humidity table provides relative humidity values for day and night. It also gives values for the maximum and minimum humidity for each day. A technical discussion of the instruments and measurements used to obtain these data tables is included. DOE

N82-33960# National Weather Service, Salt Lake City, Utah.
FORECASTING HEAVY SNOW AT WENATCHEE, WASHINGTON
James W. Holcomb Dec. 1981 20 p refs
(PB82-177783; NOAA-TM-NWS-WR-172; NOAA-82011201) Avail: NTIS HC A02/MF A01 CSCL 04B

Cases of heavy snow examined, indicated that strong warm advection was the principle characteristic of the majority of heavy snows. Further examination of these cases revealed that a high probability of heavy snow existed when temperatures at the 850 and 700-mb levels in the cold air in advance of the warm advection were below specific critical values. The only other well defined heavy snow pattern occurred during Arctic outbreaks associated with strong southward moving upper troughs or closed lows. These cases featured cold advection with heavy snow developing in easterly upslope flow flow against the Cascade range. GRA

N82-33961# Southern Solar Energy Center Planning Project, Atlanta, Ga. Wind Program Div.
WIND ENERGY FEASIBILITY ASSESSMENT FOR THE US VIRGIN ISLANDS, SITING ASSESSMENT, ECONOMIC STUDY AND PROJECT PLAN
David E. Ball, ed. Feb. 1981 110 p refs
(DE82-009476; SSEC/TP-31262) Avail: NTIS HC A06/MF A01

A preliminary assessment of the wind energy potential in the US Virgin Islands is presented. Based upon the results of this assessment and a study of the topography of the islands, potential sites for wind energy conversion systems (WECS) are identified on St. Croix, St. Thomas, and St. John. Historical wind data from the islands is sparse and the analysis techniques used in this study are relatively unsophisticated. Therefore, the identification of potential WECS sites must be considered extremely preliminary. DOE

N82-33962# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
THE APPLICATION OF US UPPER-WIND DATA IN ONE DESIGN OF TETHERED WIND ENERGY SYSTEMS
R. J. ODoherty and B. W. Roberts Feb. 1982 133 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-012880; SERI/TR-211-1400) Avail: NTIS HC A07/MF A01

The upper atmospheric wind resource for the continental United States, Hawaii, and Alaska was assessed. The probability distributions of velocity are presented for 54 sites, and detailed calm wind analyses were undertaken for five of these locations. On the average, the wind lulls about 1 day per week for a period in excess of about 30 hours. It is shown that the average power density of this wind resource can be as high as 16 kW/m(2) at northeastern US sites. This power density is at a maximum around the 300 mb pressure level. DOE

N82-33963# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
FACE-2 DATA REDUCTIONS AND ANALYSES (PRIOR TO DISCLOSURE OF THE TREATMENT DECISIONS). PART 2: THE FACE-2 CONFIRMATORY RADAR RAINFALL AND COVARIATE DATA SETS
A. G. Barnston, W. L. Woodley, and M. Brown Oct. 1981 388 p refs 2 Vol.
(PB82-172131; NOAA-TM-ERL-OWRM-8; NOAA-81122907) Avail: NTIS HC A17/MF A01 CSCL 04B

The Florida area cumulus experiment (FACE-2), an attempt to confirm the indications of seeding-induced rain increases in FACE-1 is examined. The program design and its implementation in summer experiments are described. The data reduction process and its rationale are described both for the basic rainfall data and for the predictor variables to be used in the covariate analyses. GRA

N82-33964# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
FACE-2 DATA REDUCTIONS AND ANALYSES (PRIOR TO DISCLOSURE OF THE TREATMENT DECISIONS). PART 4: FACE-2 MICROPHYSICAL DATA FOR ANALYSES OF SEEDED AND UNSEEDED CUMULUS TOWERS
Jill Jordan (National Hurricane Research Lab.), John Hallett (Nevada Univ., Reno), and Roger Reinking Oct. 1981 316 p refs 2 Vol.
(PB82-172149; NOAA-TM-ERL-OWRM-9; NOAA-81122906) Avail: NTIS HC A14/MF A01 CSCL 04B

Field studies for the confirmatory phase of the Florida Area Cumulus Experiment in dynamic cloud seeding (FACE-2) were conducted in 1978, 1979 and 1980. FACE-2 cloud microphysical data particularly pertinent to the evaluation of the effects of seeding with ice-forming nuclei are presented in this document. Descriptions of the methods of the data collection and reduction are included. Author

N82-33965# Wyoming Univ., Laramie. Dept. of Atmospheric Science.
TURBULENT DIFFUSION STUDIES OF WINTER STORMS OVER THE SIERRA NEVADA MOUNTAINS Ph.D. Thesis
Theodore S. Karacostas Dec. 1981 229 p refs
(Contract DI-7-07-83-V0001)
(PB82-178898; AS-133) Avail: NTIS HC A11/MF A01 CSCL 04B

The Lagrangian Turbulent Diffusion (LTD) model was critically evaluated and applied over the Sierra Nevada Mountains. The theory was used as basic framework for the development of the model, which expresses the complex process of turbulent diffusion as an analytical equation. The LTD model describes the time history of the seeding material as they wander through the flow field, and gives a correct picture of the actual mechanism of turbulent diffusion. It is shown, theoretically and experimentally, that the LTD model is an appropriate method to predict the diffusion of a seeded plume for diffusion times longer than the characteristic time associated with the most energetic eddies. GRA

N82-33966# Colorado Univ., Boulder. Inst. of Arctic and Alpine Research.
SAN JUAN MOUNTAINS AVALANCHE STUDY: EVALUATION AND PREDICTION OF AVALANCHE HAZARD; METEOROLOGICAL AND AVALANCHE OBSERVATIONS 1980-1981 Final Report, Nov. 1980 - Oct. 1981
Richard L. Armstrong and Betsy R. Armstrong Oct. 1981 32 p refs Sponsored in part by Bureau of Reclamation
(PB82-176967; INSTAAR-1-11-81-00549) Avail: NTIS HC A03/MF A01 CSCL 04B

A summary of weather, snow, and avalanche conditions for the 1980-1981 winter season in the Red Mountain Pass area of southwestern Colorado is presented. Air temperature, precipitation, and snow structure data are obtained from a sheltered forest clearing at an elevation of 3400 m. Wind speed and direction are measured at an exposed ridge-top site located above timberline at an elevation of 3759 m. Avalanche activity is monitored by the systematic observation of 214 individual avalanche paths located adjacent to 58 km of U.S. Highway 550 between the town of Ouray and Coal Bank Hill, along 14 km of Colorado Highway 110 between Silverton and Gladstone, and within the immediate area of Silverton itself. GRA

N82-33967# Wyoming Univ., Laramie. Dept. of Atmospheric Science.
CLOUD PHYSICS STUDIES IN SCPP(SIERRA COOPERATIVE PILOT PROJECT) DURING 1980-1981 Annual Technical Report
Thomas R. Parish, John D. Marwitz, Robert R. Lee, Glenn L. Gordon, and Alfred R. Rodi Oct. 1981 157 p refs
(Contract DI-7-07-83-V0001)
(PB82-174210; AS132) Avail: NTIS HC A08/MF A01 CSCL 04B

The physical processes of precipitation formation are studied and those conditions that provide the best potential for enhancement of winter precipitation are identified. Barrier winds along the Sierra Nevada Mountains are discussed in relation to the kinematic

structure of orographic air flow during Sierra storms. A diagnostic model for orographic air flow over the Central Sierra is presented. Secondary ice crystal production in stable orographic clouds over the Sierra Nevada is also discussed. Cloud liquid water content measurements are compared. S.L.

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-33968 California Univ., San Diego.
SPATIAL DISTRIBUTIONS OF PHYTOPLANKTON: LIMITATIONS OF POWER SPECTRUM TECHNIQUES Ph.D. Thesis
Alfred Theodore Dengler, Jr. 1981 175 p
Avail: Univ. Microfilms Order No. DA8203025

With the development of techniques for continuous measurement of biological parameters such as fluorescence and inorganic nutrients, use had been made of power spectrum techniques to described temporal and spatial variations in phytoplankton distributions and to attempt to elucidate mechanisms accounting for the spatial and temporal patterns. Results of such analyses have gained wide currently but close scrutiny reveals that the use of power spectrum techniques in this way is not justified. Not only have technical errors been committed, but also the assumptions involved in the use of power spectrum techniques have been violated. Both of these problems are addressed. The aspects of phytoplankton distributions which preclude the more ambitious applications of power spectrum techniques are demonstrated. It is concluded that for temporal scales on the order of days and spatial scales on the order of kilometers, the assumptions of homogeneity of rates and equilibrium of processes are not valid for phytoplankton. The physical processes which vary at these scales persist sufficiently for the phytoplankton to develop a local response.
Dissert. Abstr.

N82-33969# Science Applications, Inc., McLean, Va.
STATISTICAL ANALYSIS OF UPPER OCEAN TIME SERIES OF VERTICAL SHEAR Final Report, Oct. 1981 - Apr. 1982
David M. Rubenstein and Fred C. Newman May 1982 71 p refs
(Contract N00014-81-C-0075)
(AD-A117286; SAI-83-751-WA; OPD-TR-82-257-01) Avail: NTIS HC A04/MF A01 CSCL 08/3

Shear measurements from the MILE current meter observations are statistically analyzed. Much of the shear is inertial, and probability density histograms of short term records are bimodal. Over three inertial periods, shear distribution approaches Gaussianity. We derive a simple statistical model of shear, which predicts how mean square shear varies with stratification and vertical separation 5z. We compare these predictions with MILE observations. We also show that 15 minute average samples of N2 and S2 are significantly correlated. Knowing the 15 minute average value of N2 allows one to predict S2 within a factor of two at least 46% of the time, and within a factor of four at least 75% of the time. Author (GRA)

N82-33970# Texas Univ., Austin. Applied Research Labs.
A SUMMARY OF THE RESULTS OF A STUDY OF ACOUSTIC BOTTOM INTERACTION IN A RANGE DEPENDENT ENVIRONMENT
Robert A. Koch 1 Jun. 1982 85 p refs
(Contract N00014-78-C-0113)
(AD-A116891; ARL-TR-82-30) Avail: NTIS HC A05/MF A01 CSCL 20/1

This report summarizes the results of research carried out during 1981. at Applied Research Laboratories, The University of Texas at Austine (ARL:UT), on acoustic bottom interaction in a range variable environment. The major topic is adiabatic normal mode modeling of range variable environments involving slopes or lateral variation. In particular the study of slope propagation is extended to consider sediment type, sediment attenuation gradients, and analysis of energy partitioning, and a reexamination of slope angle effects. The study of lateral variability considers an absorbing patch problem and its relation to province descriptions of range variable environments. The sensitivity of propagation over slopes to lateral variation of sediment type is also considered. Author (GRA)

N82-33971# Naval Oceanographic Office, Bay St. Louis, Miss.
AEROMAGNETIC DETECTION AND DEFINITION OF SEAMOUNTS
Dewey R. Bracey Jun. 1982 28 p refs
(AD-A117153; NCO-TR-285) Avail: NTIS HC A03/MF A01 CSCL 17/6

This report develops an aeromagnetic seamount location and definition strategy using the observed anomaly characteristics and the observed relationship between the MAD electronic filter and seamount peak-depths. Limitations and recommended refinements and future development of the method are also discussed.
GRA

N82-33972# Nova Univ., Dania, Fla. Oceanographic Center.
MODELING AND ADJUSTING GLOBAL OCEAN TIDES USING SEASAT ALTIMETER DATA Final Report, 1 Nov. 1977 - 31 Dec. 1981
Georges Blaha Hanscom AFB, Mass. AFGL Mar. 1982 103 p refs.
(Contract F19628-78-C-0013; AF Proj. 2309)
(AD-A115841; AFGL-TR-82-0114) Avail: NTIS HC A06/MF A01 CSCL 08/3

In the recent past, SEASAT altimeter data together with global geoidal parameters and sets of state vectors parameters were adjusted at AFGL through the short arc algorithm using NSWC precise ephemeris. The excellent quality of the data system, including the altimeter measurements, the ephemeris, the input geoidal parameters, etc., was confirmed by the finding that the empirical variance for geoid undulations is significantly lower than the theoretical variance. The altimeter residuals from this adjustment served in regional modeling of short wavelength geoidal features, as well as in studying geophysical phenomena such as ocean bottom topography. Since the geoid is assumed to coincide with the ocean surface sensored by the altimeter, the sea surface effects were ignored in this adjustment. Due to increasing geophysical interest in a realistic representation of the open ocean tide, the latest development of the short arc satellite altimetry model allows for the inclusion of the most important tidal constituents. In particular, an adjustment algorithm has been designed in which four long period constituents, three diurnal constituents and four semidiurnal constituents may be subject to adjustment within the overall adjustment of SEASAT altimetric observations.
GRA

N82-33973# SACLANT ASW Research Center, La Spezia (Italy).
OBSERVATIONS OF THE HUELVA COOL-WATER TONGUE
Brian Wannamaker 15 Nov. 1981 24 p refs
(AD-A115673; SACLANTCEN-SM-154) Avail: NTIS HC A02/MF A01 CSCL 08/10

Data from near-polar-orbiting satellites and from ship cruises are used to describe the Huelva Cool-Water Tongue under summer conditions. This tongue extends southeasterly along the shelf break off the southwest coast of Spain and is formed as a result of the advection of water upwelled along the Portuguese cost near Faro or near Cabo St. Vicente. Estimates of the southeasterly speed of the flow are 16 to 18 cm/s from the satellite data and 18 to 28 cm/s from geostrophic calculations. A drop in sound speed of 9 m/s was measured across the tongue. Because of the variability of the tongue any environmental prediction of its occurrence should make use of high-resolution satellite data. Author (GRA)

N82-33974*# Woods Hole Oceanographic Institution, Mass.
OBSERVATIONS OF VERTICALLY PROPAGATING EQUATORIALLY-TRAPPED WAVES IN THE DEEP WESTERN INDIAN OCEAN Ph.D. Thesis

Kathleen ONeill Mar. 1982 176 p refs
(Contract NAS6-2706; Grants NsG-5090; NsG-5161; Contracts N00014-76-C-0197; N00014-76-C-01840; N00014-75-C-0700; Grants NSF ATM-76-04050-A1; NSF ATH-76-04050; NSF OCE-79-21786; NR Proj. 083-400)
(NASA-CR-169375; NAS 1.26:169375; AD-A113565; WHOI-82-11) Avail: NTIS HC A09/MF A01 CSCL 08/3

An hypothesis of equatorially-trapped waves is found to be consistent with time series of vertical profiles of horizontal velocity and CTD data from the western Indian Ocean. The profiles were collected using an acoustic dropsonde, the White Horse, along the 53 degrees E meridian. The temporal coverage is a month-long period spanning the onset of the southwest monsoon in 1976; the latitudinal coverage is 3/4 degrees S to 5 degrees N. To examine the composition of the velocity field, a WKB stretching procedure was applied to the depth and a WKB normalizing procedure to the velocity. Autospectral estimates reveal equatorial intensification that varies with vertical wavenumber. To examine vertical propagation, dropped lagged coherences have been computed. The results indicate the presence of a mixed Rossby-gravity wave of 60-77 day period with phase propagation downward at a vertical wavelength of 1200 in the stretched coordinate, which is equivalent to approximately three wavelengths between the thermocline and the bottom. Vertical propagation is indicated in other wavenumber bands as well, also corresponding to autospectral peaks. Author (GRA)

N82-33975# Coastal Engineering Research Center, Fort Belvoir, Va.
IRREGULAR WAVE RUNUP ON SMOOTH SLOPES
John P. Ahrens 20 Dec. 1981 27 p refs
(AD-A113648; CERC-CETA-81-17) Avail: NTIS HC A02/MF A01 CSCL 08/3

The results of several laboratory studies have been used to develop a method to estimate the wave runup and rundown on plane, smooth slopes caused by irregular wave action. Curves and equations are presented which can be used to compute the 2% runup, significant runup, mean runup, and approximate lower limit of rundown. A procedure is suggested for adapting the smooth slope results to wave runup on rough and porous slopes. Example problems illustrate the use of the material presented.
Author (GRA)

N82-33976# Delaware Univ., Newark. Coll. of Marine Studies.
OCEANIC FRONTAL STABILITY: A NUMERICAL MODEL
Wayne W. Martin Nov. 1981 147 p refs
(Contract N00014-75-C-0714)
(AD-A115519; CMS-02-81) Avail: NTIS HC A07/MF A01 CSCL 08/10

A stable, convergent numerical model has been developed to study the evolution of mesoscale meanders of oceanic fronts. A finite difference model was used with the frontal zone divided into two regions, a dissipative zone near the surface expression of the front, and an inviscid region where the frontal interface was deeper. The parameters studied were: wavelength/Rossby radius ratio, amplitude/wavelength ratio, and cross stream Froude number. Tests were run using oceanographic conditions representative of two regions, the Gulf Stream downstream of Cape Hatteras, and the Sargasso Sea at 30 deg N. The model was shown to be sensitive to the wavelength/Rossby radius ratio. For the Sargasso Sea conditions a 30 km disturbance was more stable with respect to amplitude growth than a 100 km disturbance. Both the magnitude and sign of the cross stream Froude number affected the meander stability, with a negative Froude number (downward entrainment near the surface front) showing the greatest amplitude growth. The model results were very sensitive to the meander amplitude. The growth rates from large amplitude tests were much lower, and closely matched observational results. This model also showed a tendency toward growing inertial period oscillations near the boundary between the dissipative and inviscid regions. GRA

N82-33977# JAYCOR, Alexandria, Va.
ELLIPTIC EQUATION SOLVERS FOR NORDA OCEAN MODELS AND A STUDY OF EQUATORIAL OCEAN DYNAMICS Final Report, 25 Nov. 1980 - 24 Nov. 1981
Alan J. Wallcraft 2 Jun. 1982 43 p refs
(Contract N00014-81-C-0085)
(AD-A117374; J206-82-001/6204) Avail: NTIS HC A03/MF A01 CSCL 08/3

Numerical experiments were performed in order to examine the generating mechanisms for equatorial Rossby solitons. It was shown that wind events representing a relaxation of the equatorial trades can generate these solitary waves subsequent to the reflection of the Kelvin wave from the eastern boundary. If the duration of the event is greater than one month, it is possible for multiple solitons to form. This is particularly true for large scale events like El Nino. The numerical calculations support the hypothesis of Boyd (1980) that solitons would most likely be generated during El Nino events. These results also suggest that even wind events on a smaller scale, both temporally and spatially, can generate Rossby solitons and that these waves may have a significant influence on the variability of the equatorial thermocline. Author (GRA)

N82-33978# Naval Underwater Systems Center, New London, Conn. Surface Ship Sonar Dept.
DOPPLER SPECTRA OF SEA-SURFACE BACKSCATTER AT HIGH ACOUSTIC FREQUENCIES
W. L. Konrad, D. G. Browning, and R. H. Mellen (MAR, Inc.) 1 Jul. 1982 14 p refs Presented at the Meeting of the Acoust. Soc. of Am., Chicago, 26-30 Apr. 1982
(AD-A117682; NUSC-TD-6735) Avail: NTIS HC A02/MF A01 CSCL 20/1

The initial transfer of energy from atmospheric wind to the ocean surface, which would be a significant factor in ambient noise, may occur via the so-called Cat's Paw phenomena. To study this effect, an experiment was conducted at Seneca Lake for a moderately disturbed (no whitecaps) air-water interface. Doppler spectrum measurements of high-frequency acoustic waves backscattered from the wind-driven water surface indicate the presence of small-scale roughness that is convected downward by surface drift. For a slightly rippled surface, there is a sharp resonant peak corresponding to a convection velocity of approximately 0.4 m/s which is nearly independent of wind speed. The spectrum is broadened by phase modulation due to the orbital motion of large-scale gravity waves but remains skewed in the downwind direction. Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-33979*# Texas Univ., Houston. Dept. of Physiology and Cell Biology.
INSULIN RESISTANCE FOR GLUCOSE METABOLISM IN DISUSED SOLEUS MUSCLE OF MICE Progress Report
Michael J. Seider, William F. Nicholson, and Frank W. Booth 28 Sep. 1981 14 p refs
(Contract NAS9-169353; Grant AM-1-9393)
(NASA-CR-169353; NAS 1.26:169353) Avail: NTIS HC A02/MF A01 CSCL 06C

Results of this study on mice provide the first direct evidence of insulin resistance for glucose metabolism in skeletal muscle that has undergone a previous period of reduced muscle usage. This lack of responsiveness to insulin developed in one day and in the presence of hypoinsulinemia. Future studies will utilize the model of hindlimb immobilization to determine the causes of these changes. L.F.M.

N82-33980# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
TECHNIQUE FOR THE AEROBIC CULTIVATION OF MICROORGANISMS IN WATER-IN-OIL EMULSIONS
1982 15 p Transl. into ENGLISH of East German Patent

No. 141393 (1980)
(NRC/CNR-TT-2031; ISSN-0077-5606) Avail: NTIS HC A02/MF A01

A technique for cultivating microorganisms in water in oil emulsions, particularly at high cell concentrations is described. Fermentation is facilitated in a reversed phase at technically and economically necessary cell concentrations. A stable water in oil emulsion is ensured at high cell concentrations by adding suitable substances to the fermentation medium. The formation of a stable reversed phase in the fermentation medium occurs when special additives are used. S.L.

N82-33981*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN ASSESSMENT OF PERT AS A TECHNIQUE FOR SCHEDULE PLANNING AND CONTROL
Charles W. Sibbers Jul. 1982 21 p
(NASA-TM-83265; NAS 1.15:83265) Avail: NTIS HC A02/MF A01 CSCL 05A

The PERT technique including the types of reports which can be computer generated using the NASA/LaRC PPARS System is described. An assessment is made of the effectiveness of PERT on various types of efforts as well as for specific purposes, namely, schedule planning, schedule analysis, schedule control, monitoring contractor schedule performance, and management reporting. This assessment is based primarily on the author's knowledge of the usage of PERT by NASA/LaRC personnel since the early 1960's. Both strengths and weaknesses of the technique for various applications are discussed. It is intended to serve as a reference guide for personnel performing project planning and control functions and technical personnel whose responsibilities either include schedule planning and control or require a general knowledge of the subject. Author

N82-33982*# Tufts Univ., Medford, Mass. Dept. of Physics.
VISCOSITY DEPENDENCE OF THE RATES OF DIFFUSIONAL PROCESSES
David L. Weaver Moffett Field, Calif. NASA. Ames Research Center Aug. 1982 13 p refs
(Contract NCA2-OR785-210)
(NASA-CR-166394; NAS 1.26:166394) Avail: NTIS HC A02/MF A01 CSCL 06C

It is shown that the rates of diffusion-controlled processes may have a solvent vicosity independent part as well as a viscosity dependent part. Some relevant experiments involving intramolecular polypeptide movements are discussed, and implications for some experiments on diffusion in membranes are outlined. Author

N82-33983*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
STIMULATION OF BODY WEIGHT INCREASE AND EPIPHYSEAL CARTILAGE GROWTH BY INSULIN LIKE GROWTH FACTOR
S. Ellis Sep. 1981 15 p refs
(NASA-TM-84285; A-9059; NAS 1.15:84285) Avail: NTIS HC A02/MF A01 CSCL 06P

The ability of insulin-like growth factor (IGF) to induce growth in hypophysectomized immature rats was tested by continuous infusion of the partially purified factor at daily doses of 6, 21, and 46 mU for an 8-day period. A dose-dependent growth of the proximal epiphyseal cartilage of the tibia and an associated stimulation of the primary spongiosa were produced by these amounts of IGF. The two highest doses of IGF also resulted in dose-dependent increases of body weight. Gel permeation of the sera at neutrality showed that the large-molecular-weight IGF binding protein was not induced by the infusion of IGF, whereas it ws generated in the sera of hypophysectomized rats that were infused with daily doses of 86 mU of human growth hormone. Author

N82-33984# Army Research Inst. of Environmental Medicine, Natick, Mass.
RESPIRATORY ADAPTATION TO ACUTE METABOLIC ACIDOSIS IN GOATS WITH ABLATED CAROTID BODIES
R. A. Steinbrook, S. Havaheri, R. A. Gabel, J. C. Donovan, and D. E. Leith 6 Mar. 1982 26 p refs
(DA Proj. 3E1-61102-BS-10)
(AD-A116657; USARIEM-M-34/82) Avail: NTIS HC A03/MF A01 CSCL 06/19

In awake goats before and after ablation of carotid bodies (CBx) we studied the effect of acute metabolic acidosis (AMA) produced by intravenous infusion of HCl on resting pulmonary ventilation, on composition of arterial blood and CSF, and on ventilatory responsiveness to hyperoxic CO2 rebreathing. The AMA caused decrease in PaCO2 (breathing air at rest) and shifted the position of CO2 response curves toward lower values of PCO2. These changes were similar before and after CBx, though the levels of PCO2 in arterial blood during air breathing, and in expired gas at a given level of ventilation during CO2 rebreathing were higher after CBx. We conclude that a respiratory adaptation to AMA does occur in goats deprived of peripheral chemoreceptors, and is probably mediated by the central chemoreceptors. Author (GRA)

N82-33985# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.
AN APPARATUS FOR THE MEASUREMENT OF PULMONARY FUNCTION IN UNANESTHETIZED SMALL ANIMALS Technical Report, Jun. 1979 - Jun. 1980
R. L. Farrand Apr. 1982 17 p refs
(DA Proj. 1L1-62706-A-553)
(AD-A114938; AD-E410545; ARCSL-TR-81094) Avail: NTIS HC A02/MF A01 CSCL 06/3

Because of public and political opinion, rising costs, and regulations, the use of some types of laboratory animals has been limited. As a result, small mammals - in particular, white rats - have become an acceptable alternative to canines for use in toxicological testing. In this report, a method is described by which unanesthetized and comfortably restrained rats are exposed by inhalation to yield fairly complete pulmonary information. GRA

N82-33986# Battelle Memorial Inst., Richland, Wash.
DOSIMETRIC AND BEHAVIORAL ANALYSIS OF MICROWAVE-DRUG SYNERGISTIC EFFECTS ON OPERANT BEHAVIOR IN THE RAT Final Report, Sep. 1979 - Dec. 1981
Richard H. Lovely, David L. Lundstrom, and Richard D. Phillips 18 Dec. 1981 26 p refs
(Contract N00014-79-C-0819)
(AD-A115115) Avail: NTIS HC A03/MF A01 CSCL 06/15

Five male Long-Evans rats, maintained at 80% of their free-feeding weight, were trained to bar-press for food reward on a one-minute fixed-interval (FI1) schedule of reinforcement. Once stable FI1 baseline response rates were established, dose-response functions were generated for Chlordiazepoxide HCl (CDZ). Subsequent treatments with CDZ were followed by 30 min. pulsed microwave radiation (MWR) and FI1 behavioral assessment. Pulsed MWR exposures were in the far zone of an anechoic chamber at an averaged incident power density of 1 mW/sq cm (PRF = 300/sec, 3 usec pulse width). After 2 replications of the combined treatments another CDZ dose-response function was generated. This was followed by 3 more CDZ and MWR replications the first of which was carried out at an averaged incident power density of 1 mW/ sq cm2 Increased rates of response for the CDZ and 1 mW/sq cm MWR treatment were demonstrated relative to initial CDZ dose-response functions in 4 of 5 rats tested. However, the dose-response functions for CDZ alone, that were generated following this apparent synergy showed the same shift in response rate. Furthur, the 8 mW/sq cm 2 pulsed MWR combined with CDZ also produced data similar to the 1 mW/sq cm post-MWR exposure CDZ dose-response functions for the animals tested. Thus, we were unable to replicate an earlier demonstration of synergy between CDZ and MWR. GRA

N82-33987# Hawaii Univ., Honolulu.
FIVE OTEC BIOFOULING AND CORROSION EXPERIMENTS AT

KEAHOLE POINT, 1976 TO 1980
F. C. Munchmeyer, L. R. Berger, and B. E. Liebert Nov. 1981 120 p refs
(Contract W-31-109-eng-38)
(DE82-008086; ANL/OTEC-BCM-026) Avail: NTIS HC A06/MF A01

The effects of biological fouling and corrosion on the seawater side of a heat exchanger tube were evaluated. Sites and field apparatus, heat transfer, water quality, biology and corrosion aspects of the OTEC experiments are discussed. Six candidate tube materials were exposed during the experiments and preliminary answers to corrosion questions were found. It is found that (1) 5052 aluminum tubes did not pit, and (2) that their rate of corrosion was slow enough to suggest a 30 year design life when the tubes are cleaned with a bristle brush. DOE

N82-33988# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES
15 Sep. 1982 145 p refs Transl. into ENGLISH from various Russian articles
(JPRS-81775) Avail: NTIS HC A07/MF A01

Studies in life sciences, biomedical sciences, and behavioral sciences are reported. The following fields of interest were studied: agricultural biology, biochemistry, biotechnology, environment effects, medical demography, medicine, microbiology, physiology, radiation biology, and human factors engineering. For individual titles, see N82-33989 through N82-33994.

N82-33989# Joint Publications Research Service, Arlington, Va.
NEW DATA ON METABOLISM AND ACTION MECHANISM OF MYCOTOXINS
V. A. Tutelyan and L. V. Kravchenko *In its* USSR Rept.: Life Sci., No. 20 (JPRS-81775) 15 Sep. 1982 p 10-23 refs Transl. into ENGLISH from Vestnik Akad. Med. Nauk SSSR (Moscow), no. 1, Jan. 1981 p 88-95 (For primary document see N82-33988 24-51)
Avail: NTIS HC A07/MF A01

The discovery of a large number of mycotoxins which are secondary metabolites of mold fungi that contaminate foods and feed is discussed. The health hazard to man and animals by mycotoxins increased attention given to he problem. More than 240 strains of different species of microscopic fungi were isolated, which produce about 100 toxic compounds which are considered to alimentary mycotoxicosis in man and animals. It is shown that the mycotoxins affect the different stages of protein and nucleic acid biosynthesis. E.A.K.

N82-33990# Joint Publications Research Service, Arlington, Va.
DESIGN OF AUTOMATED SYSTEMS FOR CONTROL OF TECHNOLOGICAL PROCESSES IN LARGE SCALE MICROBIOLOGICAL INDUSTRY WITH USE OF MICROPROCESORS
Aleksandr Alekseyevich Oprishko, Artem Vartanovich Babayants, Valentin Pavlovich Davydov, Yuriy Grigoryevich Kolpikov, and Yakov Asaipovich Khanukayev *In its* USSR Rept.: Life Sci., No. 20 (JPRS-81775) 15 Sep. 1982 p 33-37 refs Transl. into ENGLISH from Upralyayushciye Sistemy I Mashiny (Kiev), no. 6, Nov. - Dec. 1981 p 133-136 (For primary document see N82-33988 24-51)
Copyright. Avail: NTIS HC A07/MF A01

The stable trend toward increase in capacity per unit of technological equipment and intensification of technological processes, which are currently observed are attributed to economic factors which contribute to the development of this production. Changes were made to systems that are partially or entirely decentralized in management structure. Advances in semiconductor technology, which enabled ASUTP developers to use new hardware based on microprocessors enabled the change over. It is found that microprocessor equipment meets the requirements of decentralized control systems. E.A.K.

N82-33991# Joint Publications Research Service, Arlington, Va.
BIOELECTRIC FIELDS: THEIR SOURCES, NATURE AND PURPOSE
V. R. Protasov and O. A. Serdyuk *In its* USSR Rept.: Life Sci., No. 20 (JPRS-81775) 15 Sep. 1982 p 68-89 refs Transl. into ENGLISH from Usp. Sovrem. Biol. (Moscow), v. 93, no. 2, Mar. - Apr. 1982 p 270-286 (For primary document see N82-33988 24-51)
Avail: NTIS HC A07/MF A01

The possible mechanisms of effects of weak electric fields on processes of growth, development and regeneration are discussed. The role of these fields on the cellular, tissular, organismic and population levels is examined. It is concluded that bioelectric fields are an objective reality, an inalienable feature of all that lives. Moreover, electric activity of cells and tissues is used more tha once in evolution of different systems. High speed conduction of electric impulses developed on its basis; an entire group of fish developed the amazing capacity to generate and prceive strong electric fields and use them in different areas of their activity. It is assumed tha bioelectric fields are involved in processes of morphogenesis, growth and regeneration, as well as nerveless transmission of information within multicellular organisms. E.A.K.

N82-33992# Joint Publications Research Service, Arlington, Va.
EFFECT OF LOCAL VIBRATION ON DIVERS WORKING UNDER WATER
A. V. Sterlikov, F. P. Lakhov, and A. K. Belukhin *In its* USSR Rept.: Life Sci., No. 20 (JPRS-81775) 15 Sep. 1982 p 90-93 refs Transl. into ENGLISH from Gig. Tr. Prof. Zabol., (Moscow), no. 11, Nov. 1981 p 32-35 (For primary document see N82-33988 24-51)
Copyright. Avail: NTIS HC A07/MF A01

Trained divers, who performed underwater work on the basis of their physical condition were studied. Construction of underwater gas and oil lines, dams and moorage, involves considerable work by divers working in ventilated gear. Pick hammers, pneumatic drills and other vibrating tools are used often in underwater work. Divers make use mainly of low frequency vibrating tools. The conditions under which man is exposed to local vibration uner water are very different from those on the ground, due to the presence of a number of aggravating factors: cooling of the working limb and entire body, elevation of partial oxygen tension, compression and intensive noise. It is recommended that the hygienic specifications for the diver's work tool according to level of vibration it generates. Our objective here was to study the effect of local vibration generated by a tool on a diver during work, determined of physiological changes and dynamics of recovery thereof. E.A.K.

N82-33993# Joint Publications Research Service, Arlington, Va.
STRUCTURAL CHANGES IN PLASMA MEMBRANE UNDER INFLUENCE OF IONIZING RADIATION
B. S. Fomenko and I. G. Akoyev *In its* USSR Rept.: Life Sci., No. 20 (JPRS-81775) 15 Sep. 1982 p 97-115 refs Transl. into ENGLISH from Ups. Sovrem. Biol. (Moscow), v. 93, no. 2, Mar. - Apr. 1982 p 183-195 (For primary document see N82-33988 24-51)
Avail: NTIS HC A07/MF A01

The effects ionizing radiation on membranes was studied. Changes arising in the oligosaccharide layer of the surface of the cell membrane, in the protein and lipid phases of membranes under the influence of radiation, as well as possible schemes of formation of structural changes in the membrane are discussed. Molecular bases of structural membrane changes induced by radiation, and determination of their role in development of cell pathology were investigated. The influence of the state of irradiated cell membranes on their radiosensitivity are also studied. E.A.K.

N82-33994# Joint Publications Research Service, Arlington, Va.
EFFECTS OF COMBINATION OF ANTIBIOTIC-RESISTANT BIFIDOBACTERIA AND CORRESPONDING ANTIBIOTICS OF SURVIVAL OF IRRADIATED MICE
V. M. Korshunov, B. V. Pinegin, N. P. Ivanova, and V. N. Maltsev *In its* USSR Rept.: Life Sci., No. 20 (JPRS-81775) 15 Sep. 1982 p 116-121 refs Transl. into ENGLISH from Z. Mikrobiol., Epidemiol. I Immunol. (Moscow), no. 5, May 1982 p 50-53 (For primary document see N82-33988 24-51)
Avail: NTIS HC A07/MF A01

Elimination of intestinal dysbacteriosis in irradiated animals by combining antibiotics and peparations of bifidobacteria resistant to these antibiotics prolonging the life of these animals was investigated. Broad spectrum antibiotics are used to treat intestinal dysbacteriosis. Bifidobacterial preparations are used to restore the microbial cenosis and their administrtion is started after antibiotics are discontinued. There are some flaws to deferred administration of bifidobacteria, since the process of colonization of the intestine with commercial bifidobacterial preparations is rather lengthy, and there is slow elevation of bifidobacterium level in the intestinal tract, whereas exogenous recontamination of the intestine by conditionally pathogenic bacteria is possible after antibiotic therapy is discontinued. Use of antibiotics along could be the cause of intestinal dysbacteriosis. E.A.K.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-33995*# National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY. A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 235, AUGUST 1982
Aug. 1982 71 p
(NASA-SP-7011(235); NAS 1.21:7011(235)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 201 reports, articles and other documents introduced into the NASA Scientific and Technical Information system in July 1982. Author

N82-33996* National Aeronautics and Space Administration. Pasadena Office, Calif.
HYPERTHERMIA HEATING APPARATUS Patent
Paul M. Gammell, inventor (to NASA) Issued 31 Aug. 1982 8 p Filed 13 May 1980
(NASA-Case-NPO-14549-2; US-Patent-4,346,715; US-Patent-Appl-SN-149526; US-Patent-Appl-SN-918705; US-Patent-Class-128-422; US-Patent-Class-128-784; US-Patent-Class-128-804) Avail: US Patent and Trademark Office CSCL 06B

Electromagnetic energy is delivered to a localized area of a patient's body in a hyperthermic treatment so that it provides a uniform distribution of electromagnetic flux lines within the localized area of the patient's body and produces a uniform and localized heating gradient. An electrode array includes a number of electrodes which are arranged in pair, with the electrodes in each pair being spaced a particular distance apart. The array is driven by a balanced line system which is electromagnetically coupled to each pair of electrodes and which is shielded by a ground coaxial shield which itself is ground to the body of the patient. Each electrode is embedded in a Teflon stand-off in order to move the region of strong field, from the body, produced by rapidly changing potentials. The two pairs of electrodes forming a cross-like geometry are used with the balanced line systems. The electrical power is either multiplexed among the electrodes or the second pair is driven by a potential which is sinusoidal and which is 90% out of phase with the first balanced line system which is also sinusoidal.

Official Gazette of the U.S. Patent and Trademark Office

N82-33997 Marquette Univ., Milwaukee, Wis.
THE EFFECT OF DISUSE ON FAST AND SLOW SKELETAL MUSCLE Ph.D. Thesis
Frank Arthur Witzmann 1981 134 p
Avail: Univ. Microfilms Order No. 203783

It is well established that the motor activity pattern regulates physiological and molecular processes in mammalian skeletal muscle. Adaptations to disuse have been extensively studied, but observations of contractile function have yielded conflicting results. The present study was therefore undertaken to characterize the disuse-mediated alterations in both isometric and isotonic contractile properties and selected biochemical parameters in the slow, type I, soleus (SOL); the fast, type IIA and B, extensor digitorum longus (EDL); and the fast, type IIB, superficial vastus lateralis (SVL) muscles. Judging from the present findings, it is apparent that the tonically active SOL atrophies to a greater extent than the fast EDL and SVL following hindlimb casting. The preferential effect is evident in both morphological and contractile properties. It is important, however, to point out that despite preferential type I atrophy, the present data fail to substantiate fiber type switching or the notion that fast muscles are somehow unaffected by disuse. Dissert. Abstr.

N82-33998 State Univ. of New York, Buffalo.
INFLUENCE OF THE DIVING RESPONSE AND SUBMERSION ON THE BREATH-HOLDING TIME IN MAN Ph.D. Thesis
John A. Sterba 1981 170 p
Avail: Univ. Microfilms Order No. 8204124

The aim of this investigation was to determine if the diving response increases the voluntary breath-holding (BH) time in man. The diving response consists of reductions in heart rate (bradycardia) and peripheral blood flow induced by cold-water face immersion and BH. Five subjects with the strongest diving bradycardia response were selected from 32 SCUBA divers who were screened with a cold-water face immersion BH test. The maximal BH time and BH time to the first 'urge-to-breathe' were used to assess the changes in BH ability induced by the diving response. Cardiac stroke volume was measured by impedance cardiography and peripheral flow by venous occlusion plethysmography. In conclusion, while cold-water face immersion induced a pronounced diving response, this response is of no obvious biological value in man since there were no effects on gas exchange and BH time. The marked prolongation of BH time during thermoneutral submersion may increase the danger for a BH diver to lose consciousness due to hypoxia. Dissert. Abstr.

N82-33999 California Univ., Davis.
MECHANISMS OF CHANGE IN PLASMA VOLUME TO ACUTE AND CHRONIC EXERCISE IN MAN Ph.D. Thesis
Victor Anthony Convertino 1981 198 p
Avail: Univ. Microfilms Order No. 8200499

To investigate the time course and mechanism(s) of the increase in (BV) during endurance exercise training (ET), blood hematocrit, hemoglobin, and plasma volume (PV, T-1824), osmotic (Osm), electrolyte, renin activity (PRA), arginine vasopressin (AVP), and protein fractions were measured in venous blood taken from 15 men during rest and three graded work intensities on a cycle ergometer, and during ET for 2 hr/day for 8 consecutive days at 65% of their maximal oxygen uptake (VO_2 max.). The data suggest that during acute exercise, plasma hyperosmolality, produced by net hypotonic plasma efflux, stimulates AVP release, while simulation of the renin angiotensin system responds primarily to increased sympathetic activity. During repeated exposures, plasma expansion was associated with accumulative acute elevations in PRA and AVP that facilitate Na(+) and water retention and a progressive increase in plasma protein content that provides increased water binding capacity for the blood. Dissert. Abstr.

N82-34000 State Univ. of New York, Brooklyn.
SOME COMPUTER APPLICATIONS AND DIGITAL IMAGE PROCESSING IN NUCLEAR MEDICINE Ph.D. Thesis
Thomas Lowinger 1981 147 p
Avail: Univ. Microfilms Order DA8203258

Methods of digital image processing are applied to problems in nuclear medicine imaging. The symmetry properties of central nervous system lesions are exploited in an attempt to determine the three dimensional radioisotope density distribution within the lesions. An algorithm developed by astronomers at the end of the 19th century to determine the distribution of matter in globular clusters is applied to tumors. this algorithm permits the emission computed tomographic reconstruction of spherical lesions from a single view. Images of phantoms acquired by a scintillation camera

interfaced to a computer were analyzed. Both pinhole and parallel hole collimator equipped camera acquired images were studied. The three dimensional radioisotope distribution derived by the application of the algorithm can be used to characterize the lesions. The applicability to nuclear medicine images of ten edge detection methods in general usage in digital image processing were evaluated in terms of three criteria: (1) Receiver operating characteristic curves (ROC analysis); (2) Ability to preserve area; (3) Ability to preserve shape. Phantoms and clinical images were studied as a function of information density (ID). Dissert. Abstr.

N82-34001*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT. SPACE SHUTTLE PROGRAM: STS-4 POSTFLIGHT MEDICAL OPERATIONS REPORT
20 Aug. 1982 23 p
(NASA-TM-84854; E-989-81-04; NAS 1.15:84854) Avail: NTIS HC A02/MF A01 CSCL 06P

The OFT program was evaluated and demonstrates under progressively demanding conditions the safe ascent, on-orbit operations, and return of the Orbiter and crew. A variety of scientific payloads from industry, other government agencies, and universities was carried onboard this mission. Medical support logistics were evaluated, and concepts for a standardized program to be utilized during the mature STS operations were developed. S.L.

N82-34002# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
VARIATIONS IN NOISE DOSIMETER READINGS OF FLUCTUATING NOISE
Terry M. Fairman 1982 24 p refs
(AF Proj. 7231)
(AD-A115763; AFAMRL-TR-82-21) Avail: NTIS HC A02/MF A01 CSCL 06/19

Significant differences in the mean Leq(24) values were observed with dosimeters used in a study monitoring the daily noise exposures of children. That study, conducted by the Fels Research laboratory and the United States Environmental Protection Agency. In the Fels study a diffrence was observed in the mean Leq(24) values of about 7 dB using General Radio (Gen Rad) and Metrosonics noise dosimeters. The only statistically significant difference observed was between instrument types with the Gen Rad units reading higher. Possible explanations such as age and sex differences among the subjects and procedural differences were examined and ruled out. It was reasoned that group differences in mean Leq(24) recorded by the two dosimeter types were due to idiosyncrasies in the instruments themselves which resulted in systematic measurement errors. An investigation was conducted by the Bioacoustics Laboratory at Wright-Patterson AFB to determine the cause and to quantify the observed differences. Author (GRA)

N82-34003# Desmatics, Inc., State College, Pa.
RESEARCH ON THE DEVELOPMENT OF A STATISTICAL IMPACT ACCELERATION INJURY PREDICTION MODEL FROM -G(X) ACCELERATOR RUNS
Dennis E. Smith and David Aarons Jun. 1982 28 p refs
(Contract N00014-79-C-0128; NR Proj. 207-037)
(AD-A116440; TR-112-11) Avail: NTIS HC A03/MF A01 CSCL 06/19

Statistical impact acceleration injury prediction models are developed for the head/neck segment from data obtained during 68 -G sub x accelerator runs. These runs involved subhuman primates (Rhesus monkeys) with securely restrained torso and unrestrained head. The data was collected by the Naval Biodynamics Laboratory (NBDL) as part of its research effort on acceleration impact injury prevention. Three classes of prediction models are constructed, one based on sled profile variables, another based on head dynamic response variables only, and the third comprised of the combined set of independent variables. The model predictions are compared with the observed results to evaluate performance. Author (GRA)

N82-34004# Brown Univ., Providence, R. I. Center for Neural Science.
AN AUTOMATED OPTICAL DISPLAY SYSTEM FOR VISUAL PHYSIOLOGY EXPERIMENTS
J. D. Daniels and T. R Myers 5 Jul. 1982 23 p
(Contract N00014-81-K-0136; NR Proj. 201-484)
(AD-A116499; TR-5) Avail: NTIS HC A02/MF A01 CSCL 05/10

Control of a visual physiology overhead projection system has been achieved by an 8085 microprocessor system, with a supporting array of a-d converters, voltage-to-current amplifiers, d-a converters, and analog switches. Image position, speed of movement, direction, length of sweep and number of sweeps can all be programmed by the operator. Handshake lines send the 'start' and 'end' signals to another device which correlates nerve cell activity with stimulus movement. Author (GRA)

N82-34005# Eidgenoessische Anstalt fuer das Forstliche Versuchswesen, Birmensdorf (Switzerland).
DEVELOPMENT OF NITROGEN SENSOR FOR DETERMINATION OF PN(2) IN BODY TISSUES Final Report, 1 Jan. - 30 Jun. 1982
Lois S. Robblee and Maureen A. Parker Jul. 1982 30 p refs
(Contract N00014-82-C-0133; NR Proj. 201-563)
(AD-A116607; C-687) Avail: NTIS HC A03/MF A01 CSCL 06/16

Experiments were performed to determine the feasibility of an electrochemical sensor for dissolved N2 based on N2-complexing activity of Ru ammines. The formation of Ru(NH3)5N2+2 by the reaction of Ru(NH3)5H20+2 and N2(aq) was observed by voltammetry as a progressive increase in an anodic-current peak at +0.8V SCE due to the oxidation of Ru(NH3)5N3+2. Author (GRA)

N82-34006# Army Research Inst. of Environmental Medicine, Natick, Mass.
PROLONGED SELF-PACED HARD PHYSICAL EXERCISE COMPARING TRAINED AND UNTRAINED MEN
Leslie Levine, William J. Evans, Fred B. Winsman, and Kent B. Pandolf 9 Oct. 1981 26 p refs
(DA Proj. 3E1-62777-A-878)
(AD-A116608; USARIEM-M-33/82) Avail: NTIS HC A03/MF A01 CSCL 06/19

Six fit male subjects (25 yr, 180 cm, 72 kg, maximal VO2 = 2.63 mmol/kg/min to the -1 (59.0 ml/kg/min) and six sedentary male subjects (24 yr, 175 cm, 73 kg, maximal VO2=2.01 mmol/kg/min) performed self-paced hard physical exercise while walking over a 17.07 km course consisting of four different terrains (blacktop road, 4.02 km; dirt road, 4.65 km; light brush, 4.35 km; and heavy brush, 4.05 km). All subjects carried no external load, 10 kg, and 20 kg over the entire course. Subjects were instructed to walk over all terrains as fast as possible. Time on each terrain for individual subjects was used to determine walking velocity and predicted energy expenditure; heart rate (HR) and rated perceived exertion were recorded as each subject completed each terrain. Walking velocity and absolute energy expenditure were not different between the two groups ($p > 0.05$), and did not decline with time as the subjects traversed the course for any of the load carriage conditions. GRA

N82-34007# Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex. Dept. of Physiology and Biophysics.
OXYGEN TRANSPORT TO HUMAN TISSUES Final Report
Jack A. Loeppky, ed. and Marvin L. Riedesel, ed. Jun. 1981 409 p refs
(Grant AF-AFOSR-0218-81; AF Proj. 2312)
(AD-A115904; AFOSR-82-0487TR) Avail: NTIS HC A18/MF A01 CSCL 06/16

A symposium entitled Oxygen Transport to Human Tissues was held 25-27 June 1981 at the Veterans Administration Medical Center, Albuquerque, New Mexico. This symposium was supported in part by the AFOSR, NASA, The USAF School of Aerospace

Medicine, and the W. Randolph Lovelace II Memorial Lectureship Fund. A 377 page preceedings was published that includes six sections: Historical Perspectives; Alveolar-Capillary Gas Equilibration; Cardiovascular Adjustment, Oxygen Delivery, and Metabolic Needs; Effects of Altitude on Oxygen Transport; Oxygen Transport in Special Situations; and Clinical Problems in Oxygen Transport.
Author (GRA)

N82-34008# Northwestern Univ., Evanston, Ill.
A DYNAMIC MODEL OF THE CERVICAL SPINE AND HEAD Final Technical Report, May 1978 - Aug. 1980
J. Williams and T. Belytschko Wright-Patterson AFB, Ohio AFAMRL Nov. 1981 159 p refs
(Contract F33615-78-C-0523; AF Proj. 7231)
(AD-A114887; AFAMRL-TR-81-5) Avail: NTIS HC A08/MF A01 CSCL 06/19

A data base of the head and cervical spine structure for a three dimensional mathematical model of the human head-spine system was developed on the basis of recently obtained geometric and stiffness data. The model was developed for predicting detailed head-spine system responses and injury probabilities during, for example, retraction/ejection and ground impact. This model of the head and cervical spine structure treats the cervical spine and head as a collection of rigid bodies and deformable elements; the rigid bodies represent the vertebral bodies and head and the deformable elements represent the intervertebral discs, ligaments, facet joints and muscles. The model is completely three dimensional and can treat nonlinearities due to large displacements and material properties. The geometric data consist of the initial configuration of the vertebrae and the points of attachments of the muscles, discs and ligaments to the vertebrae. Particular attention was devoted to reproducing the orientations of the articular facets. Stiffness data for the intervertebral discs, ligaments and facet joints were developed. A muscle model which includes reflex and voluntary activation was included for the major muscles. Inertial data was developed by estimating the height and cross sectional area of the sections of the neck associated with each motion segment and multiplying by a uniform density. GRA

N82-34009# Civil Aeromedical Inst., Oklahoma City, Okla.
EFFECTS OF PRIOR PHYSICAL EXERTION ON TOLERANCE TO HYPOXIA, ORTHOSTATIC STRESS, AND PHYSICAL FATIGUE
Michael T. Lategola, Peggy J. Lyne, and Mary J. Burr Mar. 1982 15 p refs
(AD-A114741; FAA-AM-82-4) Avail: NTIS HC A02/MF A01 CSCL 06/19

Ten healthy men, 20-35 years old, were tested for tolerance to hypoxia, orthostatic stress, and physical fatigue after a period of rest, and, on another occasion, after a period of physical exertion. Exertion consisted of four 10-min periods of pedal ergometry; each period consisted of a 30-watt (W) load imposed for 2 min, 60 W for 4 min, and 100 W for 4 min. Testing included a 100-min exposure to an oxygen/nitrogen gas mixture equivalent to 3658 m of altitude, 2 min of lower body negative pressure (LBNP) at -40 torr differential pressure, and 6 min of 50 W pedal ergometry. Psychomotor testing was conducted during hypoxic exposure. Although some statistically significant ($p < \text{or} = 0.05$) physiological decrements were associated with prior physical exertion, psychomotor performance and mentation were not significantly affected. In this study, prior physical exertion produced no adverse effects on physiological tolerances, mentation, or psychomotor performance. Author (GRA)

N82-34010# School of Aerospace Medicine, Brooks AFB, Tex.
RESPONSES TO HARMONIC ACCELERATION WITH VARYING HEAD POSITIONS Final Report, 1 Mar. - 30 Oct. 1981
Daniel E. Dreher, Kennith W. Stevens, Edward J. Engelkens, and James W. Wolfe Mar. 1982 8 p refs
(AF Proj. 7755)
(AD-A114736; SAM-TR-82-5) Avail: NTIS HC A02/MF A01 CSCL 06/19

To determine if a particular head position results in maximal response to stimulation, 50 subjects were tested with sinusoidal acceleration in three head positions with reference to the horizontal plane. A PDP-11/34 digital computer was used to analyze the responses. The pertinent parameters were gain, phase, and directional preponderance. The results showed no difference in the parameters for the three head positions. This suggests that positioning a subject's head for rotational testing is not as critical as previously believed. Author (GRA)

N82-34011# Naval Aerospace Medical Research Lab., Pensacola, Fla.
AIRSICKNESS DURING NAVAL FLIGHT OFFICER TRAINING: ADVANCED SQUADRON VT86-RIO (NEW SYLLABUS)
W. Carroll Hixson, Fred E. Guedry, Jr., J. Michael Lentz, and Garry L. Holtzman Sep. 1981 67 p refs
(AD-A114685; NAMRL-1281) Avail: NTIS HC A04/MF A01 CSCL 05/9

This report is the sixth in a series dealing with a longitudinal study of airsickness in the Basic, Advanced, and Fleet Readiness Squadrons comprising the Naval Flight Officer Training Program. Flight data are presented on a second group of VT86-RIO students receiving secondary training under a new flight syllabus. Of the 106 students included in the study, approximately 72% reported being airsick on one or more flights, 46% reported vomiting on one or more flights, and 43% considered their flight performance to have been degraded by airsickness on one or more hops. Of the 2,072 hops flown by the students, airsickness, vomiting, and performance degradation were reported to have occurred on 18.1, 8.8, and 6.9%, respectively, of the flights. The report details the flight data by hops and by students and also relates the airsickness performance of the student group to performance on a selected battery of motion reactivity tests administered to a large segment of the squadron population prior to beginning flight training.
Author (GRA)

N82-34012# Naval Ocean Systems Center, San Diego, Calif.
REMOTE MEDICAL DIAGNOSIS SYSTEM (RMDS) ADVANCED DEVELOPMENT MODEL (ADM) LABORATORY TEST RESULTS Test Report, Apr. 1978 - May 1979
W. T. Rasmussen, I. Stevens, P. D. Hayes, J. West (WESTEC Services, Inc.), and F. W. Hunzelman (WESTEC Services, Inc.) Jan. 1982 213 p
(Contract N66001-78-C-0274; MO933PN)
(AD-A114073; NOSC/TR-691) Avail: NTIS HC A10/MF A01 CSCL 06/5

This report provides laboratory experimental evaluation of video transmissions of radiographs over the remote medical diagnosis system (RMDS) advanced development model terminals. The objectives of this evaluation were to obtain quantitative and qualitative data on the functional parameters of the RMDS ADM terminals and components, to define design risks associated with the current approach to RMDS implementation, and to provide baseline data to support follow-on procurement of RMDS engineering development model (EDM) terminals. Author (GRA)

N82-34013# Brown Univ., Providence, R. I. Center for Neural Science.
NEURON SELECTIVITY: SINGLE NEURON AND NEURON NETWORKS
L. N. Cooper, P. Munro, and C. Scofield 8 Jul. 1982 41 p refs
(Contract N00014-81-K-0136)
(AD-A116886; Rept-6) Avail: NTIS HC A03/MF A01 CSCL 06/16

A theory for neuron selectivity in visual cortes is presented and compared with neurophysiological data. In this theory, a neuron becomes maximally selective over the set of patterns presented to it. Theoretical predictions corespond well with results of various experimental paradigms including normal rearing, monocular and binocular deprivation, and reverse suture. Extensions of the theory to cortical networks based on anatomical data are discussed. The ideal synapse, which can alter its function between excitatory and inhibitory modes, must be resolved into

excitatory and inhibitory synapses to agree with anatomical observation. A mathematical appendix provides stability analysis of the model's fixed point behavior. GRA

N82-34014# Naval Health Research Center, San Diego, Calif.
AN EEG PREDICTOR OF PERFORMANCE DECREMENT IN A VIGILANCE TASK Final Report, Oct. 1978 - Mar. 1982
David J. Hord Mar. 1982 14 p refs
(MR0410103)
(AD-A116960; NAVHLTHRSCHC-82-2) Avail: NTIS HC A02/MF A01 CSCL 05/10

An attempt was made to discover measures of EEG that could predict performance decrement on long term monitoring tasks in subjects who had not been previously sleep deprived. Ten subjects took part in a study in which alpha numeric symbols were discriminated on 1100 trials during continuous 3 hr watches. Each subject completed the 3 hr watch on each of 3 consecutive days. The reaction times for all trials on Day 2 and Day 3 were divided into the 10 percent fastest, 10 percent slowest, and the errors of omission (EO) for each session. Brain activity at the vertex (C2) was derived from the one second period preceding each trial. Ensemble spectral analysis of the EEG was completed for each subject to yield intensity at integral values of frequency from 1 to 12 Hz. It was found that the ratio of slow activity to intermediate (7-12 Hz) EEG activity at the vertex can differentiate EO trials from fast and slow responses and is reliable over at least 3 days. The technique could be used to monitor errors of omission in operational settings. Author

N82-34015# Beth Israel Hospital, Boston, Mass. Div. of Behavioral Medicine.
VENTILATORY RESPONSES TO EXERCISE WHILE ELICITING THE RELAXATION RESPONSE
Margaret A. Caudill, Ilan Kutz, John W. Hoffman, Gene Stainbrook, and Kent B. Pandolf 16 Apr. 1982 20 p refs
(Grants PHS-HL-22727; PHS-HL-07374; DA Proj. 3E1-62777-A-878)
(AD-A115102; USARIEM-M28/82) Avail: NTIS HC A02/MF A01 CSCL 06/19

The effect of the elicitation of the relaxation response by use of a meditative technique on selected ventilatory variables was studied in eleven experimental (E) subjects who pedaled on an electrically-braked cycle ergometer at a low exercise intensity (50 W) while simultaneously eliciting this response. Subjects in the E group had regularly elicited the relaxation response for a mean of 5.4 yrs (+ or - 1.4 S.E.). Respiratory rate (breaths/min 18.5C, 13.6E), minute ventilation (liters/min 20.17C, 17.92E), and ventilatory for oxygen (26.06C, 23.16E) decreased and tidal volume (liters/breath 1.15C, 1.49E) increased significantly ($p < \text{or} = 0.05$) during the relaxation response period in the E group. None of these ventilatory responses differed significantly ($p > 0.05$) between groups either before or after the meditation period. Differences seen in oxygen uptake and the respiratory exchange ratio between groups throughout exercise were not significant while the heart rate response was significantly higher for the E group throughout exercise. Rated perceived exertion significantly increased in the E group between the meditative (9.7) and post-meditative (11.0) period. These changes demonstrate that a voluntary wakeful mental activity that produces the relaxation response may alter ventilatory responses during exercise. GRA

N82-34016# Kentucky Univ., Lexington. Biomedical Engineering Center.
DYNAMIC RESPONSE OF VERTEBRAL ELEMENTS RESPONSE OF THE INTERVERTEBRAL JOINT TO TORSION Annual Report, 1 Jan. - 31 Dec. 1981
J. F. Lafferty and D. A. Bowman 24 Feb. 1982 13 p ref Presented at the 1st Southern Biomed. Eng. Conf., Shreveport, La., 7-8 Jun. 1982
(Grant AF-AFOSR-3488-78; AF Proj. 2312)
(AD-A115125; WGRL-82-1; AFOSR-82-0420TR) Avail: NTIS HC A02/MF A01 CSCL 06/19

Creep response obtained from torsional stress tests of the intervertebral joint are used to develop an analytical model. A series chain of four Kelvin units was found to provide an excellent representation of the viscoelastic properties of the material. Author (GRA)

N82-34017# Army Research Inst. of Environmental Medicine, Natick, Mass.
ACUTE ALBUMIN-INDUCED PLASMA VOLUME EXPANSION AND EXERCISE IN THE HEAT: EFFECTS ON HORMONAL RESPONSES IN MEN
Ralph P. Francesconi, M. N. Sawka, R. W. Hubbard, and M. Mager 9 Apr. 1982 20 p refs
(AD-A115180; USARIEM-M27/82) Avail: NTIS HC A02/MF A01 CSCL 06/19

To assess the responses of plasma hormones to acute expansion of plasma volume and exercise in the heat, 50 g of albumin or 200 ml saline was administered intravenously followed by exercise (40% VO sub 2 max) in the heat (45 C/20% rh). Blood samples were obtained after sitting in the heat for one hour, one hour after completion of infusion, after standing for 30 minutes, and 15, 30, 45 and 60 minutes after commencing exercise. While plasma cortisol was generally unaffected by these treatments, postural and exercise effects were manifested in the absence of the diurnal decrease that ordinarily occurs during the morning hours. Aldosterone levels were generally decreased and growth hormone levels were unaffected by albumin administration, while exercise in the heat resulted in an increase in both these hormones in the control and experimental groups. Angiotensin I levels were significantly decreased at several sampling intervals by albumin administration, but unaffected by exercise; however, vasopressin was unaffected by all experimental procedures. No correlations could be drawn between the intensity of these adaptational responses and the ability to complete the exercise protocol. Author (GRA)

N82-34018# Letterman Army Inst. of Research, San Francisco, Calif.
COMPARISON OF RHESUS AND HUMAN SPECTRAL DYNAMIC VISUAL ACUITY
Harry Zwick, Kenneth R. Bloom, and David O. Robbins Apr. 1982 11 p refs
(AD-A115258; LAIR-82-33TN) Avail: NTIS HC A02/MF A01 CSCL 05/10

The visual acuity of humans and rhesus monkeys is quite comparable for stationary targets. However, in many situations visual acuity is required for targets that are moving rather than stationary. In this experiment, we have measured the dynamic visual acuity function for the rhesus and compared it with the dynamic visual acuity for the human. For targets that are achromatic, the rhesus and human are quite comparable, although the Rhesus seems to have somewhat better acuity for targets that are moving at the upper velocity extremes. When measurements were made with chromatic targets, however, certain differences appeared across species. In the short end of the spectrum, the blue region, the rhesus is somewhat superior in its acuity for high velocity targets; in the long end of the visible spectrum, the rhesus appears somewhat weaker in its ability to resolve rapidly moving targets. These differences are not inconsistent with recent observations of spectral differences between human and rhesus reported for static acuity measurements. Author (GRA)

N82-34019# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
ZERO-CROSSINGS AND SPATIOTEMPORAL INTERPOLATION IN VISION: ALIASING AND ELECTRICAL COUPLING BETWEEN SENSORS
T. Poggio, H. K. Nishihara, and K. R. K. Nielsen May 1982 50 p refs
(Contract N00014-75-C-0643; Grant NSF MCS-79-23110)
(AD-A117608; AI-M-675) Avail: NTIS HC A03/MF A01 CSCL 09/4

We will briefly outline a computational theory of the first stages of human vision according to which; (a) the retinal image is filtered

by a set of centresurround receptive fields (of about 5 different spatial sizes) which are approximately bandpass in spatial frequency; and (b) zero-crossings are detected independently in the output of each of these channels. Zero-crossings in each channel are then a set of discrete symbols which may be used for later processing such as contour extraction and stereopsis. A formulation of Logan's zero-crossing results is proved for the case of Fourier polynomials an extension of Logan's theorem to 2-dimensional functions is also proved. Within this framework, we shall describe an experimental and theoretical approach (developed by one of us with M. Fahle) to the problem of visual acuity and hyperacuity of human vision. The positional accuracy achieved, for instance, in reading a vernier is astonishingly high, corresponding to a fraction of the spacing between adjacent photoreceptors in the fovea. Stroboscopic presentation of a moving object can be interpolated by our visual system into the perception of continuous motion; and this 'spatiotemporal' interpolation also can be very accurate. It is suggested that the known spatiotemporal properties of the channels envisaged by the theory of visual processing outlined above implement an interpolation scheme which can explain human vernier acuity for moving targets. GRA

N82-34020# Naval Construction Battalion Center, Port Hueneme, Calif.
BIODYNAMIC DATA BANK FEASIBILITY STUDY
Carley C. Ward Wright-Patterson AFB, Ohio AMRL Jun. 1982 24 p refs
(Contract F007624-79-0007; AF Proj. 7231)
(AD-A117921; AFAMRL-TR-82-39) Avail: NTIS HC A02/MF A01 CSCL 06/19

The report presents an investigation into the feasibility of establishing a biodynamic data base at Air Force Aerospace Medical Laboratory. The original objective of this study was to assess the feasibility of a biodynamic data bank at AMRL. Potential problems were to be analyzed, and recommendations made regarding the basic design and indexing scheme. Considering the overwhelming need for organization and storage of the data, and the available digital data mangement techniques, a biodynamic data bank is definitely feasible. It is the various data bank options which need to be carefully considered. In this document AMRL's data base requirements are examined. The procedure and programs which will satisfy these requirements are recommended for implementation. Author (GRA)

N82-34021# Army Research Inst. of Environmental Medicine, Natick, Mass.
EFFECTIVENESS OF ICE (WATER) PACKETS VESTS IN REDUCING HEAT STRESS
George F. Fonseca Mar. 1982 44 p refs
(DA Proj. 3E1-62777-A-878)
(AD-A117864; USARIEM-T-3/82) Avail: NTIS HC A03/MF A01 CSCL 09/19

The auxiliary cooling provided over the torso area by each of two similar ice (water) packets vests was directly measured on a life-sized sectional manikin. These vests were worn with a combat vehicle crewman (CVC) ensemble plus a complete chemical protective (CW) suit. Cooling rates provided (watts) versus time were determined for a completely wet (maximal sweating) skin condition during heat exposure to three hot environments. The number of ice packets attached to a vest varied from 43 to 91 ice pacekts. When approximately 50% of the torso surface area is covered by ice packets, each additional ice packet added to the vest increases the torso cooling to a greater degree than an ice packet added to a vest with less than 50% torso surface area coverage. Interface temperature between two ice packets and the torso surface and the temperature changes inside one ice packet during and experiment, were also measured. Author (GRA)

N82-34022# Brookhaven National Lab., Upton, N. Y. Biomedical and Environmental Assessement Div.
TOXICITY OF SILICON COMPOUNDS
Kenneth M. Novak Jun. 1981 14 p refs
(Contract DE-AC02-76CH-00016)
(DE82-014245; BNL-51509) Avail: NTIS HC A02/MF A01

Silica toxicity was reviewed relative to assessing the health risks from a developing photovoltaic industry. Mechanism of physiological damage, possible exposure pathways of concern, and potential occupational and public hazards were examined. Acute and chronic effects were differentiated and appropriate methods for quantitative risk assessment described. DOE

N82-34023# National Bureau of Standards, Washington, D.C. National Measurement Lab.
TABLES OF ENERGY-DEPOSITION DISTRIBUTIONS IN WATER PHANTOMS IRRADIATED BY POINT-MONODIRECTIONAL ELECTRON BEAMS WITH ENERGIES FROM 1 TO 60 MeV, AND APPLICATIONS TO BROAD BEAMS
M. J. Berger and S. M. Seltzer Jan. 1982 58 p refs Presented at the Electron Dosimetry and Arc Therapy Symp., Madison, Wisc., 10-11 Sep. 1981 Sponsored in part by DOE and ONR
(PB82-178716; NBSIR-82-2451) Avail: NTIS HC A04/MF A01 CSCL 06R

Tables of elementary three-dimensional absorbed-dose distributions in a water phantom irradiated by monoenergetic, point-monodirectional electron beams are presented. Distributions were obtained by the Monte Carlo method for 14 beam energies from 1 MeV to 60 MeV. The tabulated results can be applied to the determination of absorbed-dose distributions from parallel beams of arbitrary finite cross section. The beam of interest is treated as a superposition of point-monodirectional beams, and the absorbed-dose distribution is obtained as a corresponding superposition of elementary absorbed-dose distributions. By way of example, the tabulated data are used to obtain (1) depth-dose curves and practical ranges in broad-beam geometry, and (2) central-axis depth-dose curves, radial distributions of absorbed dose, and isodose patterns for beams with finite circular cross section. GRA

N82-34024# Science Information Services, Inc., Philadelphia, Pa.
BIOLOGICAL EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION: A DIGEST OF CURRENT LITERATURE, JULY THROUGH SEPTEMBER 1981, VOLUME 6, NUMBER 1
Bruce Kleinstein Dec. 1981 180 p
(PB82-176504; NTIA-CR-81-15-Vol-6-No-1) Avail: NTIS HC A09/MF A01 CSCL 06R

Research highlights on the biological effects and health implications of microwave and other radio frequency radiations are included. News items and announcements, a listing of meetings and conferences, and abstracts of research and literature are presented. GRA

N82-34025# CONCAWE, Hague (Netherlands). Industrial Hygiene Sub-Group.
EXPOSURE TO ATMOSPHERIC BENZENE VAPOUR ASSOCIATED WITH MOTOR GASOLINE
J. M. Tims, M. Conrard, G. F. Cutolo, V. A. Dodsworth, P. Edgington, H. C. Frohne, G. P. Gaskill, G. Rousseaux, W. Rubben, A. Truchot et al Feb. 1981 61 p refs
(PB82-174244; CONCAWE-2/81) Copyright. Avail: NTIS HC A04/MF A01 CSCL 06J

A general interest in personal exposure to benzene was accentuated in 1976 when the US Federal Occupational Safety and Health Administration (OSHA) issued a regulation reducing employee exposure limits from 10 ppm to 1 ppm measured as an 8-hour time weighted average (TWA). The data collected during 1977 and 1978 in normal handling of gasoline in European manufacturing and distribution systems are summarized. GRA

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-34026# Chicago Univ., Ill. Center for Decision Research.
A THEORY OF DIAGNOSTIC INTERFERENCE. 1: IMAGINA-

TION AND THE PSYCHOPHYSICS OF EVIDENCE
Hillel J. Eindhorn and Robin M. Hogarth Jun. 1982 79 p refs
(Contract N00014-81-K-0314)
(AD-A115940; TR-2) Avail: NTIS HC A05/MF A01 CSCL 05/10

Diagnostic inference involves the assessment and generation of causal hypotheses to account for observed outcomes/evidence. The importance of diagnosis for prediction, defining 'relevant' variables, and illuminating the nature of conflicting metaphors in inference is first discussed. Since many diagnostic situations involve conflicting evidence, a model is developed for describing how people assess the likelihood that one of two hypotheses is true on the basis of varying amounts of evidence for each. A central notion is that one compares the evidence at hand with the evidence that 'might have been.' This is modeled via an anchoring and adjusting process where the anchor represents 'what is' and the adjustment is based on imaging a contrast case for comparison. Four aspects of this model are then considered. The relation between evidentiary strength and amount of evidence (the evidence function) is shown to mimic a set of power functions. Moreover, the form of the function implies that people will trade-off relative frequency (p) for amount of evidence (n) at small n; that the absolute amount of evidence effects evidentiary strength independent of p; and that 'over' underweighting' of probabilities decreases as amount of evidence increases. GRA

N82-34027# RAND Corp., Santa Monica, Calif.
ON THE MODELLING OF CREATIVE BEHAVIOR
Harold Cohen Nov. 1981 65 p refs
(AD-A116896; RAND/P-6681) Avail: NTIS HC A04/MF A01 CSCL 05/10

The introduction to this paper discusses the notion of human creativity, and raises the question of designing a 'creative' computer program. Creativity is assumed not to imply the possession of special mental equipment: a theory of creativity should be a theory of intellect which accounts for normal performance and enhanced performance in the same terms. Art-making is described as a form of creative behavior which demonstrates the important of non-rational features. It is argued that the central feature of 'enhanced' intellectual performance is the individual's ability to modify, by the manipulation of internal representations, his/her own mental structures. GRA

N82-34028# New Mexico State Univ., Las Cruces. Dept. of Psychology.
STRUCTURES OF MEMORY FOR CRITICAL FLIGHT INFORMATION Interim Report, 1 May 1980 - 31 Jul. 1981
Roger Schvaneveldt, W., Timothy E. Golsmith, Francis T. Durso, Kenneth Maxwell, and Hector M. Acosta Williams AFB, Ariz. Air Force Human Resources Lab. Jun. 1982 118 p refs
(Contract F33615-80-C-0004; AF Proj. 2313)
(AD-A116510; AFHRL-TP-81-46) Avail: NTIS HC A06/MF A01 CSCL 05/10

This paper reviews work that has been done on defining and measuring conceptual structures of critical flight information in Air Force fighter pilots. Individuals with widely varying flight experience were tested. Cognitive structures were defined by analytic procedures; e.g., Multidimensional Scaling (MDS) and General Weighted Networks (GWN). The MDS analysis showed that the level of flying experience can be predicted from the pilot's conceptual structure. The GWN analysis led to the identification of specific points of agreement and disagreement in the conceptual organization of novice and expert pilots. Pilots do have measurable cognitive structures for organizing flight-related information. These structures are measurably different for individuals with different flight experience. The techniques employed in the research produce descriptions of conceptual structure that may have applications in the training program of fighter pilots and in assessing individual differences in the development of appropriate conceptual structures. Author (GRA)

N82-34029# Perceptronics, Inc., Woodland Hills, Calif.
HRTES HUMAN RESOURCES TEST AND EVALUATION SYSTEM. VOLUME 1: TEST PROCEDURES
Jonathan D. Kaplan, Norman D. Schwalm, and William H. Crooks May 1982 60 p refs
(Contract DAHC19-77-C-0055)
(AD-A115594) Avail: NTIS HC A04/MF A01 CSCL 05/10

This chapter includes a brief description of the contents of HRTES and a summary of the procedures that can be used to identify and evaluate human performance in an Operational Test. The chapter also describes the products that will be developed when HRTES is used, and the relationship of these HRTES products to the other documents that are produced during the course of planning and conducting operational tests. This chapter concludes with a description of the organization of these two HRTES volumes. Author (GRA)

N82-34030# Perceptronics, Inc., Woodland Hills, Calif.
HRTES HUMAN RESOURCES TEST AND EVALUATION SYSTEM. VOLUME 2: SUPPLEMENT
Jonathan D. Kaplan, Norman D. Schwalm, and William H. Crooks May 1982 226 p refs
(Contract DAHC19-77-C-0055)
(AD-A115595) Avail: NTIS HC A11/MF A01 CSCL 05/10

Guidance is planning and evaluating human performance for operational tests is given. A series of steps (or tasks) that are performed in planning and evaluating human factors are given. A list of tasks for a number of military systems is given. R.J.F.

N82-34031# Washington Univ., Seattle. Dept. of Psychology.
STRESS, ANXIETY, AND COGNITIVE INTERFERENCE: REACTIONS TO TESTS
Irwin G. Sarason 1 Apr. 1982 56 p refs
(Contract N00014-80-C-0522)
(AD-A113564; CO-ONR-005) Avail: NTIS HC A04/MF A01 CSCL 05/10

Test anxiety, its nature and relationships to performance and cognitive interference, are analyzed from the standpoint of attentional processes. A new instrument to assess dimensions of reactions to tests is presented, and its psychometric properties are described. The scales of the Reactions to Tests questionnaire (Worry, Tension, Test-irrelevant Thinking, Bodily Symptoms) were compared with regard to intellective performance and cognitive interference. The results were consistent with the idea that the problem of anxiety is, to a significant extent, a problem of intrusive thoughts that interfere with task-focused thinking. In the last of the three studies reported, it was shown that self-preoccupying intrusive thinking can be reduced by means of a task-focusing experimental condition. The studies suggest that the Reactions to Tests questionnaire may be useful in defining anxiety more sharply and improving understanding of how it relates to performance. Author (GRA)

N82-34032# Illinois Univ., Urbana. Engineering-Psychology Research Lab.
THE EFFECT OF STIMULUS-CENTRAL PROCESSING-RESPONSE COMPATIBILITY AND RESOURCE COMPETITION ON PILOT PERFORMANCE
Diane Sandry and Christopher D. Wickens Apr. 1982 67 p refs
(Contract N00014-79-C-0658)
(AD-A113754; EPL-82-1/ONR-82-1) Avail: NTIS HC A04/MF A01 CSCL 05/10

The concept of stimulus-central processing-response compatibility is described as a principle by which a task with verbal central-processing components is best served by auditory input and speech response, while a task with spatial processing components is best served by visual input and manual response. A model is proposed that predicts the joint effects of S-C-R compatibility and resource competition when a spatial and verbal task, each paired with all four input/output modality combinations, is time-shared with a visually displayed manual control task. This model was tested in an F-18 flight simulator. Nine subjects time-shared a discrete verbal (communication, navigation, and identification), and spatial (target acquisition) task with the task of flying the simulator through two-dimensional 'tunnel' in the sky.

Each discrete task was performed singly with all four i/o combinations, and also concurrently with the flight task. The predictions of the model were upheld. Single task performance on each task benefitted from increasing levels of S-C-R compatability. In dual task conditions, performance was influenced jointly by compatibility and by resource competition as predicted from the multiple resource model. Furthermore, conditions of high compatibility were uninfluenced by increases in flight task difficulty, while conditions of low compatibility suffered degradation from the difficulty increase. GRA

N82-34033# Embry-Riddle Aeronautical Inst., Daytona Beach, Fla. Aviation Research Center.
THE EFFECTS OF PILOT EXPERIENCE OF ACQUIRING INSTRUMENT FLIGHT SKILLS, PHASE 2 Final Report, Mar. 1981 - Jan. 1982
Charles W. Holmes and Jerry M. Childs Mar. 1982 142 p refs Prepared in cooperation with Seville Research Corp., Pensacola, Fla.
(Contract DOT-FA79NA-6040)
(AD-A113576; DOT/FAA/CT-82/35) Avail: NTIS HC A07/MF A01 CSCL 05/9

Because of the relatively high involvement of low-time noninstrument rated general aviation pilots in fatal weather-related accidents, a study was undertaken by the FAA through a contract with Embry-Riddle Aeronautical University (E-RAU) to determine the relationship between total flight time and the ability to acquire instrument flying skills. Specifically, the study examined the feasibility of reducing the present 200-hour experience requirement (FAR 61.65) for an instrument rating. The results of the study indicated that a reduction in the 200-hour requirement should be considered. The study reported here extended the findings of that study to a more heterogeneous population, aircraft of greater complexity, and a training program conducted in a noninstitutional setting. Thirty-five low-time pilots of diverse ages and occupations completed an instrument training program conducted at the FAA Technical Center. Cessna 172 and Mooney M20 aircraft were used in training. Author (GRA)

N82-34034# Johns Hopkins Univ., Baltimore, Md.
EXPERIMENTAL ANALYSIS OF TEAM PERFORMANCE: METHODOLOGICAL DEVELOPMENTS AND RESEARCH RESULTS
Henry H. Emurian, Joseph V. Brady, R. L. Ray, James L. Meyerhoff, and Edward H. Mougey 6 Jul. 1982 57 p refs
(Contract N00014-80-C-0467)
(AD-A116915; TR-ONR-6) Avail: NTIS HC A04/MF A01 CSCL 05/9

A programmed environment research laboratory that was designed and constructed to support functional analyses of individual and team performance effectiveness viewed conceptually within the context of a small scale microsociety is described. The technical and organizational merits of a behavioral program, which structures team members' use of resources in a disciplined yet meaningful way, are suggested as a promising solution to the problem of motivating and monitoring individual and team performances. Previous research emphases, findings and more recent analyses of effects of replacing an established team participant with a novice team member are summarized. Finally, the results of such a replacement analysis, which was undertaken with a Team Multiple Task Performance Battery (TMTPB), are presented to demonstrate the dynamic interplay between individual and team performance effectiveness. Author

N82-34035# Dalhousie Univ., Halifax (Nova Scotia). Centre for Research in Sensory Psychology and Medical Physics.
ASSESSMENT AND DEVELOPMENT OF OCULOMOTOR FLYING SKILLS BY THE APPLICATION OF THE CHANNEL THEORY OF VISION Annual Report, 1 Oct. 1980 - 30 Sep. 1981
D. Regan Mar. 1982 74 p refs
(Grant AF-AFOSR-3711-78; AF Proj. 2313)
(AD-A115325; AFOSR-82-0441TR) Avail: NTIS HC A04/MF A01 CSCL 05/9

Pilots' landing and formation flight performance on the ASPT simulator correlated with visual sensitivity to an expanding flow pattern and with depth tracking test errors. Pilots who were better able to differentiate different rates of expansion of a test flow pattern achieved a greater percentage of hits and misses in low-level flight and bombing tasks. Aircraft flying grades correlated with flow pattern test results. Author (GRA)

N82-34036# Purdue Univ., Lafayette, Ind. Graduate School of Management.
HUMAN CAPITAL ADJUSTMENTS TO TECHNOLOGICAL CHANGE IN THE COMPUTER INDUSTRY: THE CASE OF SCIENTISTS AND ENGINEERS Final Report
William N. Cooke Jul. 1981 74 p refs
(Grant NSF SRS-79-11318)
(PB82-180969) Avail: NTIS HC A04/MF A01 CSCL 05I

On-the-job training plays a significant role in the adaptation of scientists and engineers to changing technology; format education acquired by full-time employees, however, does not. Also, the scientist or engineer is not likely to increase earnings as a result of on-the-job training or of the acquisition of format education unless a higher degree is earned. On-the-job training is veiwed by the author as an employer decision and investment, and the theory of implicit contracts as more relevant in its explanation than the theory of the accumulation of human capital. Finally a conventional schooling and years of experience model, presuming completion of education before entry to the labor market, was not found to be adequate to explain earnings of scientists and engineers because such a large proportion partake of subsequent schooling and training. Author

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-34037*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SIXTEENTH ANNUAL CONFERENCE ON MANUAL CONTROL
Jul. 1982 647 p refs Conf. held in Cambridge, Mass., 5-7 May 1980 Prepared in cooperation with MIT, Cambridge
(NASA-TM-84273; A-9000; NAS 1.15:84273) Avail: NTIS HC A99/MF A01 CSCL 05H

Manual control is discussed in terms of operator modeling, measurement of human response, mental workload, pilot/operator opinion, effects of motion, aircraft displays, supervisory control, automobile driving, and remote manipulation. For individual titles, see N82-34038 through N82-34075.

N82-34038*# Illinois Univ., Chicago. Coll. of Engineering.
MODELING OF HUMAN OPERATOR DYNAMICS IN SIMPLE MANUAL CONTROL UTILIZING TIME SERIES ANALYSIS
Gyan C. Agarwal, Frank Osafo-Charles, William D. ONeill, and Gerald L. Gottlieb *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 1-28 refs (For primary document see N82-34037 24-54)
(Grants NSF ENG-76-08754; NS-00196; NS-12877)
Avail: NTIS HC A99/MF A01 CSCL 05H

Time series analysis is applied to model human operator dynamics in pursuit and compensatory tracking modes. The normalized residual criterion is used as a one-step analytical tool to encompass the processes of identification, estimation, and diagnostic checking. A parameter constraining technique is introduced to develop more reliable models of human operator dynamics. The human operator is adequately modeled by a second order dynamic system both in pursuit and compensatory tracking modes. In comparing the data sampling rates, 100 msec between samples is adequate and is shown to provide better results than 200 msec sampling. The residual power spectrum and eigenvalue analysis show that the human operator is not a generator of periodic characteristics. Author

N82-34039*# Systems Research Labs., Inc., Dayton, Ohio.
A GUNNER MODEL FOR AN AAA TRACKING TASK WITH INTERRUPTED OBSERVATIONS
C. F. Yu, K. C. Wei, and M. Vikmanis (AMRL, Wright-Patterson AFB, Ohio) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 29-38 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The problem of modeling a trained human operator's tracking performance in an anti-aircraft system under various display blanking conditions is discussed. The input to the gunner is the observable tracking error subjected to repeated interruptions (blanking). A simple and effective gunner model was developed. The effect of blanking on the gunner's tracking performance is approached via modeling the observer and controller gains. Author

N82-34040*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
MODELING HUMAN TARGET ACQUISITION IN GROUND-TO-AIR WEAPON SYSTEMS
A. V. Phatak, R. L. Mohr, M. Vikmanis (AMRL, Wright-Patterson AFB, Ohio), and K. C. Wei (Systems Research Laboratories, Dayton, Ohio) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 40-48 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The problems associated with formulating and validating mathematical models for describing and predicting human target acquisition response are considered. In particular, the extension of the human observer model to include the acquisition phase as well as the tracking segment is presented. Relationship of the Observer model structure to the more complex Standard Optimal Control model formulation and to the simpler Transfer Function/ Noise representation is discussed. Problems pertinent to structural identifiability and the form of the parameterization are elucidated. A systematic approach toward the identification of the observer acquisition model parameters from ensemble tracking error data is presented. Author

N82-34041*# National Aerospace Lab., Amsterdam (Netherlands).
THE EFFECT OF VISUAL INFORMATION ON THE MANUAL APPROACH AND LANDING
P. H. Wewerinke *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 49-64 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The effect of visual information in combination with basic display information on the approach performance. A pre-experimental model analysis was performed in terms of the optimal control model. The resulting aircraft approach performance predictions were compared with the results of a moving base simulator program. The results illustrate that the model provides a meaningful description of the visual (scene) perception process involved in the complex (multi-variable, time varying) manual approach task with a useful predictive capability. The theoretical framework was shown to allow a straight-forward investigation of the complex interaction of a variety of task variables. Author

N82-34042*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
THE EFFECTS OF MULTIPLICATIVE MOTOR NOISE ON THE OPTIMAL HUMAN OPERATOR MODEL
Alper K. Caglayan and William H. Levison *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 106-118 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The effects of a multiplicative motor noise model on the optimal-control human operator model were analyzed. A study of the interaction between multiplicative motor noise variance, plant dynamics, and predicted operator response behavior shows that, in general, an increase in motor noise variance produces a decrease in operator gain and a decrease in high-frequency remnant. An increase in multiplicative motor noise variance is also reflected by an increase in the effective motor time constant; in the absence of a cost penalty on commanded control, the motor time constant equals the motor noise variance. Author

N82-34043*# Systems Technology, Inc., Mountain View, Calif.
TRAINING AIRCRAFT DESIGN CONSIDERATIONS BASED ON THE SUCCESSIVE ORGANIZATION OF PERCEPTION IN MANUAL CONTROL
Robert K. Heffley, Warren F. Clement, and Samuel J. Craig (Vought Corp., Hawthorne, Calif.) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 119-126 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The thesis that pilot skill development in the Navy approach and landing task is very strongly tied to the aircraft closure rate and, therefore, that pilot training for this task should be based on an appropriate progression closure rate is considered. A rational and explicit determination of design point approach speeds as well as other important aerodynamic features for training aircraft is also considered. Two keys are discussed: recognition of the significance of transitioning from a purely compensatory control loop technique to one involving a pursuit crossfeed between throttle and pitch attitude, and addressing the terminal flight path adjustment in terms of range-to-go. Author

N82-34044*# Tokyo Univ. (Japan). Dept. of Aeronautics.
AN EXPERIMENTAL STUDY OF HUMAN PILOT'S SCANNING BEHAVIOR
Kyuichiro Washizu, Keiji Tanaka (National Aerospace Lab., Tokyo), and Tatsuo Osawa *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 128-134 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The scanning behavior and the control behavior of the pilot who manually controls the two-variable system, which is the most basic one of multi-variable systems are investigated. Two control tasks which simulate the actual airplane attitude and airspeed control were set up. In order to simulate the change of the situation where the pilot is placed, such as changes of flight phase, mission and others, the subject was requested to vary the weightings, as his control strategy, upon each task. Changes of human control dynamics and his canning properties caused by the modification of the situation were investigated. By making use of the experimental results, the optimal model of the control behavior and the scanning behavior of the pilot in the two-variable system is proposed from the standpoint of making the performance index minimal. Author

N82-34045*# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany). Dept. of Human Factors Engineering and Simulations.
PARAMETRIC IDENTIFICATION OF HUMAN OPERATOR MODELS
Norbert R. Ninz *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 137-145 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The accurate and efficient identification of the human operator is still a need in human factors engineering especially concerning multivariable control. Control theoretic identification methods need to be tested with human operator models under realistic boundary conditons. The requirements and criteria for the use of parametric methods, selected models as well as the Maximum Likelihood Method and the Extended Kalman Filter are displayed. The experiments and results are comparatively discussed from the point of practical engineering. Author

N82-34046*# Georgia Inst. of Tech., Atlanta. Systems Engineering Lab.
A COMPUTER SIMULATION APPROACH TO MEASUREMENT OF HUMAN CONTROL STRATEGY
Joanne Green, Esther Lee Davenport, Harold F. Engler, and William E. Sears, III *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 146-151 refs (For primary

document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Human control strategy is measured through use of a psychologically-based computer simulation which reflects a broader theory of control behavior. The simulation is called the human operator performance emulator, or HOPE. HOPE was designed to emulate control learning in a one-dimensional preview tracking task and to measure control strategy in that setting. When given a numerical representation of a track and information about current position in relation to that track, HOPE generates positions for a stick controlling the cursor to be moved along the track. In other words, HOPE generates control stick behavior corresponding to that which might be used by a person learning preview tracking. Author

N82-34047*# Analytic Sciences Corp., Reading, Mass.
PILOT MODEL HYPOTHESIS TESTING
John R. Broussard (Information and Control Systems, Inc., Hampton, Va.) and Paul W. Berry *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 152-170 refs (For primary document see N82-34037 24-54)
(Contract N00014-75-C-0432)
Avail: NTIS HC A99/MF A01 CSCL 05H

The aircraft control time history predicted by the optimal control pilot model and actual pilot tracking data obtained from NASA Langley's differential maneuvering simulator (DMS) are analyzed. The analysis is performed using a hypothesis testing scheme modified to allow for changes in the true hypothesis. A finite number of pilot models, each with different hypothesized internal model representations of the aircraft dynamics, are constructed. The hypothesis testing scheme determines the relative probability that each pilot model best matches the DMS data. By observing the changes in probabilities, it is possible to determine when the pilot changes control strategy and which hypothesized pilot model best represent's the pilot's control behavior. J.D.

N82-34048*# Massachusetts Inst. of Tech., Cambridge.
SUBJECTIVE SCALING OF MENTAL WORKLOAD IN A MULTI-TASK ENVIRONMENT
Bahman Daryanian *In* NASA. Ames Research Center 16th Conf. on Manual Control Jul. 1982 p 172-187 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Those factors in a multi-task environment that contribute to the operators' 'sense' of mental workload were identified. The subjective judgment as conscious experience of mental effort was decided to be the appropriate method of measurement. Thurstone's law of comparative judgment was employed in order to construct interval scales of subjective mental workload from paired comparisons data. An experimental paradigm (Simulated Multi-Task Decision-Making Environment) was employed to represent the ideal experimentally controlled environment in which human operators were asked to 'attend' to different cases of Tulga's decision making tasks. Through various statistical analyses it was found that, in general, a lower number of tasks-to-be-processed per unit time (a condition associated with longer interarrival times), results in a lower mental workload, a higher consistency of judgments within a subject, a higher degree of agreement among the subjects, and larger distances between the cases on the Thurstone scale of subjective mental workload. The effects of various control variables and their interactions, and the different characteristics of the subjects on the variation of subjective mental workload are demonstrated. J.D.

N82-34049*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EFFECT OF COUNTING AND TRACKING ON VERBAL AND PRODUCTION METHODS OF TIME ESTIMATION
Kathleen L. Bird (San Jose State Univ.) and Sandra Hart (Tufts Univ.) *In its* 16th Ann. Conf. on Manual Control Jul. 1982 p 189-210 refs (For primary document see N82-34037 24-54)
(Contract NCC2-34; Grant NsG-2156)
Avail: NTIS HC A99/MF A01 CSCL 05H

The effects of time estimation technique and task condition on the production and verbal estimation of time intervals ranging from 5 to 14 sec were investigated. The duration of time intervals during each task condition pretracking, tracking (subject performed a one-axis tracking), and posttracking was estimated by the subjects. The ratio of the subject's time estimate to actual interval length was computed for each trial. Productions were typically longer than verbal estimates of the same duration and produced durations were typically too long whereas verbal estimates were too short relative to the correct duration. A significant interaction was found between counting technique and tracking condition for both estimation methods. A significant effect could be attributed to the addition of a tracking task: produced durations increased in length, whereas verbal estimates decreased in length. The durations produced without counting were significantly less accurate and consistent with the addition of a tracking task. Verbal estimation mean accuracy, but not consistency, was adversely affected by the addition of a tracking task when the subjects were instructed not to count. J.D.

N82-34050*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A MODEL-BASED TECHNIQUE FOR PREDICTING PILOT OPINION RATINGS FOR LARGE COMMERCIAL TRANSPORTS
William H. Levison *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 216-241 refs Prepared in cooperation with Douglas Aircraft Co., Inc., St. Louis, Mo. (For primary document see N82-34037 24-54)
(Contract NAS1-15529)
Avail: NTIS HC A99/MF A01 CSCL 05H

A model-based technique for predicting pilot opinion ratings is described. Features of this procedure, which is based on the optimal-control model for pilot/vehicle systems, include (1) capability to treat 'unconventional' aircraft dynamics, (2) a relatively free-form pilot model, (3) a simple scalar metric for attentional workload, and (4) a straightforward manner of proceeding from descriptions of the flight task environment and requirements to a prediction of pilot opinion rating. The method was able to provide a good match to a set of pilot opinion ratings obtained in a manned simulation study of large commercial aircraft in landing approach. Author

N82-34051*# National Aerospace Lab., Tokyo (Japan).
AN ANALYTICAL PREDICTION OF PILOT RATINGS UTILIZING HUMAN PILOT MODEL
Keiji Tanaka and Kyuichiro Washizu (Tokyo Univ., Japan) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 243-252 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

In order to analytically predict pilot ratings, an evaluation method of a manual control system which consists of an aircraft and a human pilot, is proposed and examined. The method is constructed upon the assumptions that the control mission determines the critical frequency the pilot should bring to his focus, and that the degree of closed-loop stability and the human compensation necessary to attain the stability determine the human subjective evaluation of the system. As a result, a simple evaluation chart is introduced. The chart enables prediction of the subjective evaluation, if the controlled element dynamics and the mission are given. The chart is in good accord with almost all of the existing results of pilot ratings. This method has the following advantages: (1) simplicity, in a sense that the method needs to evaluate only two typical controlled element parameters, namely, the gain slope and the phase at the critical control frequency; (2) applicability to unstable controlled elements; (3) predictability of controllability limits of manual control; (4) possibility of estimating human compensatory dynamics. Author

N82-34052*# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. Dept. of Electrical Engineering.
EFFECTS OF HIGHER ORDER CONTROL SYSTEMS ON AIRCRAFT APPROACH AND LANDING LONGITUDINAL HANDLING QUALITIES

Muhammad A. Pasha (Pakistan AF), John J. DAzzo, and James T. Silverthorn *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 254-263 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

An investigation of approach and landing longitudinal flying qualities, based on data generated using a variable stability NT-33 aircraft combined with significant control system dynamics is described. An optimum pilot lead time for pitch tracking, flight path angle tracking, and combined pitch and flight path angle tracking tasks is determined from a closed loop simulation using integral squared error (ISE) as a performance measure. Pilot gain and lead time were varied in the closed loop simulation of the pilot and aircraft to obtain the best performance for different control system configurations. The results lead to the selection of an optimum lead time using ISE as a performance criterion. Using this value of optimum lead time, a correlation is then found between pilot rating and performance with changes in the control system and in the aircraft dynamics. It is also shown that pilot rating is closely related to pilot workload which, in turn, is related to the amount of lead which the pilot must generate to obtain satisfactory response. The results also indicate that the pilot may use pitch angle tracking for the approach task and then add flight path angle tracking for the flare and touchdown. Author

N82-34053*# Princeton Univ., N. J. Flight Research Lab.
PILOT OPINIONS OF SAMPLING EFFECTS IN LATERAL-DIRECTIONAL CONTROL
Robert F. Stengel and George E. Miller *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 265-270 refs (For primary document see N82-34037 24-54)
(Contract N00014-78-C-0257)
Avail: NTIS HC A99/MF A01 CSCL 05H

Flight experiments with a microprocessor control system were conducted to determine the effects of variations in sampling parameters on several pilots' opinions of lateral-directional flying qualities. Princeton's variable-response research aircraft (VRA), which is equipped with a microprocessor based digital flight control system (Micro-DFCS), was the test vehicle. Two U.S. Navy pilots evaluated the effects of sampling rate, quantization, and pure time delay during tracking, approach, and landing. Aircraft carrier approach tasks were conducted using a Navy approach mirror. Acquisition and tracking of fixed objects on the ground provided additional information related to the Navy mission. The longitudinal controls were implemented with analog electronics, while the lateral-directional pilot inputs (stick and rudder) were fed to the Micro-DFCS, which commanded the ailerons and rudder. The conceptual relationship between the evaluation pilot's lateral-directional inputs, the flight computer, and the aircraft are illustrated. Author

N82-34054*# Arizona Univ., Tucson. Dept. of Systems and Industrial Engineering.
A MODEL OF SUBJECTIVE PROBABILITIES FROM SMALL GROUPS
William R. Ferrell and Kelly Rehm *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 271-284 refs (For primary document see N82-34037 24-54)
(Grant NSF ENG-78-09365)
Avail: NTIS HC A99/MF A01 CSCL 05H

Methods for aggregating the opinions of individual forecasters in order to improve the quality of probabilistic forecasts are presented. Experimental results obtained by Seaver in his study of probability judgments by groups of four people are considered. The decision variable partition model of subjective probability and a simple model of the effects of interaction on judgments were used to simulate the group judgment of discrete probabilities investigated by Seaver. The initial results of the simulation are very promising in that (1) they show the principal effects Seaver observed and (2) these effects can, for the most part, be traced to specific characteristics of the models. J.D.

N82-34055*# Computer Sciences Corp., Mountain View, Calif.
VISUAL/MOTION CUE MISMATCH DURING A COORDINATED ROLL MANEUVER
D. K. Shirachi *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 285-291 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The effect of a performance mismatch between the simulator visual and motion display systems on pilot performance while engaged in a compensatory tracking task, and the effect of a reduction in simulator motion scaling while maintaining constant visual scaling on pilot performance for this same task were investigated. A jet transport aircraft with motion in the roll and lateral simulator axes was used as a test vehicle for a computer simulation. The aircraft was disturbed by moderate levels of turbulence which resulted in flight path deviations in the roll and lateral axes. The task of the pilot was to maintain flight formation behind the aircraft in front of him as displayed by a video monitor located in the simulator cockpit. Experimental data consisting of pilot describing functions and pilot performance scores are presented and discussed as they relate to experimental evidence. J.D.

N82-34056*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
A PERFORMANCE ANALYSIS STUDY OF A COMPLEX G FIELD EXPERIMENT
D. W. Repperger *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 292-315 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

A performance analysis on data from an experiment which illustrates the degradation of tracking performance as the human is subjected to an environmental stressor is presented. The performance changes are defined and the statistical properties of human tracking with and without the stress effects examined. Performance is evaluated using an extension of a phase plane technique. A quantiative determination of stress effects on performance is defined explicitly in terms of parameters of a density function identified from the empirical data. The distribution functions which characterize tracking in a phase plane representation of the closed loop error signal are determined. J.D.

N82-34057*# Systems Technology, Inc., Hawthorne, Calif.
DESCRIPTION/DEMONSTRATION OF BIODYN-80. A SOFTWARE PACKAGE FOR EVALUATING THE TRANSMISSIBILITY BETWEEN VEHICLE VIBRATION AND MOTIONS OF HANDS (IN CONTROLS), LIMBS, HEAD AND EYES
Susan A. Riedel, Henry R. Jex, and Raymond E. Magdaleno *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 317-339 refs (For primary document see N82-34037 24-54)
(Contract F33615-79-C-0519)
Avail: NTIS HC A99/MF A01 CSCL 05H

A user-oriented program for exercising the 1980 verson of the biodynamic model BIODYN-80 is described. The user inputs (modifies) some 80-100 variables describing the assumed posture, interface characteristics (e.g., stick 'feel' properties), and vestibular characteristics. The computer calculates the transfer functions between vibration input and various selected outputs of interest to the user. Another option is to output the operator's torso-limb-neuromuscular loop transmissibilities as seen at the stick, as required for the PIVIB computer program for computing tracking performance effects of vibration. Applications to some current problems are demonstrated. Author

N82-34058*# Connecticut Univ., Storrs. Dept. of Electrical Engineering and Computer Science.
MODELING LATERAL ACCELERATION EFFECTS ON PILOT PERFORMANCE
Jonathan Korn and David L. Kleinan *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 340-348 refs (For primary document see N82-34037 24-54)

Avail: NTIS HC A99/MF A01 CSCL 05H

Attendent to the direct side force maneuver of a Vectored Force Fighter is the transverse acceleration imposed on the pilot. This lateral acceleration (Gy), when combind with a positive Gz stress, is a potential source of pilot tracking performance impairment. A research effort to investigate these performance decrements includes experimental as well as anaytical pilot performance modeling using the Optimal Control Model. Author

N82-34059*# Systems Technology, Inc., Hawthorne, Calif.
A COMPREHENSIVE SYSTEM MODEL FOR MOTION/SPACE SICKNESS. PRELIMINARY RESULTS
Susan A. Riedel *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 349-368 refs (For primary document see N82-34037 24-54)
(Contract NAS2-10430)
Avail: NTIS HC A99/MF A01 CSCL 05H

A preliminary attempt to categorize and order the observed facts regarding motion sickness into a rational structure is discussed. An array of key facts, as assembled from the recent literature, consisting of a collection of motion space sickness observations which should be accounted for in the comprehensive model are given. A model structure which is responsive to the array of key facts, as well as to the other requirements of a working research tool (modularity, ease of use, conciseness, etc.) is also suggested. R.J.F.

N82-34060*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EVALUATION OF A TRAJECTORY COMMAND CONCEPT FOR MANUAL CONTROL OF CARRIER APPROACHES AND LANDINGS
Walter E. McNeill, G. Allan Smith, Jr., and Ronald M. Gerdes *In its* 16th Ann. Conf. on Manual Control Jul. 1982 p 370-391 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

A novel trajectory control system concept was implemented to provide manual control of a conventional jet aircraft. This concept, called Total Aircraft Flight Control System (TAFCOS), utilizes an inverse model of the aerodynamic and propulsion characteristics and employs feedforward control to provide the required acceleration command. The concept requires on-board digital computations which can easily be handled by a modern airborne computer. The system was studied in a piloted simulation of the carrier approach and landing task with primarily visual flight and guidance cues. The principal modes of vertical flight-path control investigated were vertical velocity command and vertical acceleration command. The study included manual carrier approaches with and without moderate ship motion and associated air disturbances, and tests of the effects of discrete gusts. Manual control of flight path through this new concept was shown to be feasible as an addition to an automatic control system and to have potential as an improved mode of control over conventional control for the carrier approach task. Author

N82-34061*# Systems Technology, Inc., Mountain View, Calif.
APPLICATION OF A PILOT CONTROL STRATEGY IDENTIFICATION TECHNIQUE TO A JOINT FAA/NASA GROUND-BASED SIMULATION OF HEAD-UP DISPLAYS FOR CTOL AIRCRAFT
Wayne F. Jewell *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 395-409 refs (For primary document see N82-34037 24-54)
(Contract NAS2-10385)
Avail: NTIS HC A99/MF A01 CSCL 05H

A technique for measuring a pilot's control strategy was developed, evaluated, and applied to a joint FAA-NASA ground-based simulation of two competing concepts of head-up displays for use in conventional takeoff and landing aircraft. The technique, called the Non-Intrusive Pilot Identification Program (NIPIP), estimates the pilot's input-output describing function and combined pilot-vehicle performance parameters such as crossover frequency and phase margin by using a time domain model of the pilot and a least-squares identification algorithm. NIPIP functions in realtime and uses a sliding time window to maintain freshness in the data; thus time-varying characteristics in the pilot's control strategy can be measured. R.J.F.

N82-34062*# Grumman Aerospace Corp., Bethpage, N.Y. Guidance and Control Dept.
DESIGN, SIMULATION AND EVALUATION OF ADVANCED DISPLAY CONCEPTS FOR THE F-16 CONTROL CONFIGURED VEHICLE
Robert W. Klein and Walter M. Hollister (MIT) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 424-438 refs (For primary document see N82-34037 24-54)
(Grant AF-AFOSR-3260-78)
Avail: NTIS HC A99/MF A01 CSCL 05H

Advanced display concepts to augment the tracking ability of the F-16 Control Configured Vehicle (CCV) were designed, simulated, and evaluated. A fixed-base simulator was modified to represent the F-16 CCV. An isometric sidearm control stick and two-axis CCV thumb button were installed in the cockpit. The forward cockpit CRT was programmed to present an external scene (numbered runway, horizon) and the designed Heads Up Display. The cockpit interior was modified to represent a fighter and the F-16 CCV dynamics and direct lift and side force modes were programmed. Compensatory displays were designed from man-machine considerations. Pilots evaluated the Heads up Display and compensatory displays during simulated descents in the presence of several levels of filtered, zero-mean winds gusts. During a descent from 2500 feet to the runway, the pilots tracked a point on the runway utilizing the basic F-16, F-16 CCV, and F-16 CCV with advanced displays. Substantial tracking improvements resulted utilizing the CCV modes, and the displays were found to even further enhance the tracking ability of the F-16 CCV. R.J.F.

N82-34063*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SEPARATION MONITORING WITH FOUR TYPES OF PREDICTORS ON A COCKPIT DISPLAY OF TRAFFIC INFORMATION
Sharon Jago and Everett Palmer *In its* 16th Ann. Conf. on Manual Control Jul. 1982 p 439-446 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

A clear and concise display format for use in later full mission simulator evaluation of the cockpit display of traffic information (CDTI) concept was studied. This experiment required airline pilots to monitor a CDTI and make perceptual judgments concerning the future position of a single intruder aircraft in relationship to their own aircraft (ownship). The main experimental variable was the type of predictor used to display future position of each aircraft. Predictors were referenced to the ground or to ownship and they either included turn rate information or did not. Other variables were the aircraft's separation distance when the judgment was required and the type of encounter (straight or turning). Results indicate that under these experimental conditions fewer errors were made when the predictor included turn rate information. There was little difference in overall error rate for the curved ground referenced and the ownship referenced predictors. R.J.F.

N82-34064*# Ohio State Univ., Columbus. Dept. of Industrial and Systems Engineering.
COMBINED DISCRETE NETWORK. CONTINUOUS CONTROL MODELLING OF OPERATOR BEHAVIOR
R. A. Miller and Deborah J. Seifert (Airesearch Manufacturing Co., Phoenix, Ariz.) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 448-463 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

The situation in which an operator is faced with a continuous control task plus one or more discrete information processing tasks is discussed. A modelling approach which has the capability of realistically representing both types of tasks and the resulting interactions is sought. The modelling approach utilizes discrete network models for the cognitive tasks and elements of an

open-loop - closed-loop control representation for the continuous task. the approach is demonstrated through its application to a simulated Digital Avionics Information System in which subjects were required to perform retrieval and processing tasks as well as flight control. This model differs from conventional model in that system status sampling is not necessarily continuous or periodic. Rather, the pilot is assumed to read system status displays only as time permits and operate in a so-called open-loop preprogrammed fashion between sampling. R.J.F.

N82-34065*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.
A MODEL OF HUMAN DECISION MAKING IN MULTIPLE PROCESS MONITORING SITUATIONS
Joel S. Greenstein and William B. Rouse (Illinois Univ., Urbana) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 465-486 refs Previously announced as A82-29671 (For primary document see N82-34037 24-54)
(Grant NsG-2119)
Avail: NTIS HC A99/MF A01 CSCL 05H

Human decision making in multiple process monitoring situations is considered. It is proposed that human decision making in many multiple process monitoring situations can be modeled in terms of the human's detection of process related events and his allocation of attention among processes once he feels event have occurred. A mathematical model of human event detection and attention allocation performance in multiple process monitoring situations is developed. An assmption made in developing the model is that, in attempting to detect events, the human generates estimates of the probabilities that events have occurred. An elementary pattern recognition technique, discriminant analysis, is used to model the human's generation of these probability estimates. The performance of the model is compared to that of four subjects in a multiple process monitoring situation requiring allocation of attention among processes. R.J.F.

N82-34066*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
PROCRU: A MODEL FOR ANALYZING FLIGHT CREW PROCEDURES IN APPROACH TO LANDING
S. Baron, G. Zacharias, R. Muraidharan, and R. Lancraft *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 488-520 refs (For primary document see N82-34037 24-54)
(Contract NAS2-10035)
Avail: NTIS HC A99/MF A01 CSCL 05H

A model for the human performance of approach and landing tasks that would provide a means for systematic exploration of questions concerning the impact of procedural and equipment design and the allocation of resources in the cockpit on performance and safety in approach-to-landing is discussed. A system model is needed that accounts for the interactions of crew, procedures, vehicle, approach geometry, and environment. The issues of interest revolve principally around allocation of tasks in the cockpit and crew performance with respect to the cognitive aspects of the tasks. The model must, therefore, deal effectively with information processing and decision-making aspects of human performance. R.J.F.

N82-34067*# Systems Research Labs., Inc., Dayton, Ohio.
APPLICATION OF OPTIMAL CONTROL PRINCIPLES TO DESCRIBE THE SUPERVISORY CONTROL BEHAVIOR OF AAA CREW MEMBERS
Chris Hale and George J. Valentino (Air Foce Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 523-532 (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Supervisory decision making and control behavior within a C(3) oriented, ground based weapon system is being studied. The program involves empirical investigation of the sequence of control strategies used during engagement of aircraft targets. An engagement is conceptually divided into several stages which include initial information processing activity, tracking, and ongoing adaptive control decisions. Following a brief description of model parameters, two experiments which served as initial investigation into the accuracy of assumptions regarding the importance of situation assessment in procedure selection are outlined. Preliminary analysis of the results upheld the validity of the assumptions regarding strategic information processing and cue-criterion relationship learning. These results indicate that this model structure should be useful in studies of supervisory decision behavior. Author

N82-34068*# Arnott (Douglas R.), Huntington Station, N.Y.
DOES MAN ALWAYS CLOSE THE LOOP IN TRYING TO PILOT A LARGE SHIP?
Douglass R. Arnott and T. Govindaraj (Purdue Univ., Lafayette, Ind.) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 533-538 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Control of a slowly responding complex dynamic system such as a large supertanker poses special problems for the human. Experienced ship's crew members maneuvered a simulated ship in real time. The simulation was performed using a graphics display run by a DPD 11/40 minicomputer. The maneuvers consisted of piloting a large ship along a narrow waterway. Preliminary results suggest that the human operates as a feedforward controller utilizing the preview information for 'gross changes' in heading, and as a feedback controller for correcting small deviations. The instruments displayed on the deck do not seem to be helpful in all situations. In fact, evidence seems to indicate that some of the displays might even interfere with the pilot's attempt to form a good internal model. Author

N82-34069*# Technische Hogeschool, Delft (Netherlands).
SUPERVISION OF DYNAMIC SYSTEMS: MONITORING, DECISION-MAKING AND CONTROL
Ted N. White *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 540-547 refs Sponsored by Netherlands Organization for the Advancement of Pure Research (ZWO) (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Effects of task variables on the performance of the human supervisor by means of modelling techniques are discussed. The task variables considered are: The dynamics of the system, the task to be performed, the environmental disturbances and the observation noise. A relationship between task variables and parameters of a supervisory model is assumed. The model consists of three parts: (1) The observer part is thought to be a full order optimal observer, (2) the decision-making part is stated as a set of decision rules, and (3) the controller part is given by a control law. The observer part generates, on the basis of the system output and the control actions, an estimate of the state of the system and its associated variance. The outputs of the observer part are then used by the decision-making part to determine the instants in time of the observation actions on the one hand and the controls actions on the other. The controller part makes use of the estimated state to derive the amplitude(s) of the control action(s). B.W.

N82-34070*# Westfaelische Wilhelms Univ., Muenster (West Germany).
EFFECTS OF MOTIVATION ON CAR-FOLLOWING
Tom Boesser *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 549-556 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Speed- and distance control by automobile-drivers is described best by linear models when the leading vehicles speed varies randomly and when the driver is motivated to keep a large distance. A car-following experiment required subjects to follow at 'safe' or at 'close' distance. Transfer-characteristics of the driver were extended by 1 octave when following 'closely'. Nonlinear properties of drivers control-movements are assumed to reflect different motivation-dependent control strategies. Author

N82-34071*# Institute for Perception RVO-TNO, Soesterberg (Netherlands).
LEVELS OF STEERING CONTROL: REPRODUCTION OF STEERING-WHEEL MOVEMENTS
Hans Godthelp *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 557-582 refs (For primary document see N82-34037 24-54)
(Grant NSF PFR-79-17348)
Avail: NTIS HC A99/MF A01 CSCL 05H

A schematic description of the steering control process is presented. It is shown that this process can be described in terms of levels of control. Level of control will depend on driver's skill in making use of 'clever' strategies which may be related to knowledge about the path to follow (input) and/or the vehicle under control. This knowledge may be referred to as an internal model of a particular task element. Internal information, as derived from these internal models will probably be used together with proprioceptive feedback. It is hypothesized that the efficiency of the higher levels of control will be dependent on the accuracy of both the internal and proprioceptive information. Based on this research philosophy a series of experiments is carried out. Two primary experiments were done in order to analyse subjects' ability to reproduce steering-wheel positions and movements without visual feedback. Steering-wheel angle amplitude, steering force and movement frequency were involved as independent variables.
Author

N82-34072*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A COMPARISON OF CONTROL MODES FOR TIME-DELAYED REMOTE MANIPULATION
Gregory P. Starr *In its* 16th Ann. Conf. on Manual Control Jul. 1982 p 584-591 refs Previously announced as A79-30223 (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Transmission time delay in the communication channel of a manual control system is investigated. A time delay can exist in remote manipulation systems, caused by long communication distances or bandwidth limitations. Ferrell [1] conducted the first research in time-delayed manipulation using a two degree-of-freedom manipulator. His subjects, working at time delays of 1.0, 2.1, and 3.2 s, could accomplish tasks even requiring great accuracy. The subjects spontaneously adopted a pattern of moving cautiously, then waiting to see the results of their actions. In experiments with a six degree-of-freedom master-slave manipulator system and time delays of 1.0 to 6 s, Black [2] saw that subjects tried to use the move-and-wait strategy; but there were often difficulties. The subjects seemed to have a problem in holding the master arm stationary while waiting for feedback. Any undesired drifting of the master arm introduced a discrepancy between the positions of the master and slave. This discrepancy was not perceived because of the time delay. The subject would then begin his next move with an inherent error. The difficulty of effectively using the move-and-wait strategy with a master-slave manipulator suggested that rate control might be a more effective control mode with time delay.
B.W.

N82-34073*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Robotics and Teleoperator Group.
EXPERIMENTAL EVALUATION OF THE CONCEPT OF SUPEVISORY MANIPULATION
T. L. Brooks and T. B. Sheridan (MIT) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 593-605 refs (For primary document see N82-34037 24-54)
(Contracts NAS7-100; N00014-77-C-0256; Grant SG-04-7-158-44079)
Avail: NTIS HC A99/MF A01 CSCL 05H

A computer-controlled teleoperator system which is based on task-referenced sensor-aided control has been developed to study supervisory manipulation. This system, called SUPERMAN, is capable of performing complicated tasks in real-time by utilizing the operator for high-level functions related to the unpredictable portions of a task, while the subordinate machine performs the more well-defined subtasks under human supervison. To determine whether supervisory control schemes such as these offer any advantage over manual control under real-time conditions, a number of experiments involving both simple and complicated tasks were performed. Six representative tasks were chosen for the study: (1) obtaining a tool from a rack, (2) returning the tool to the rack, (3) removing a nut, (4) placing samples in a storage bin, (5) opening and closing a valve, and (6) digging with a shovel. The experiments were performed under simulated conditions using four forms of manual control (i.e., switch rate, joystick rate, master-slave position control, and master-slave with force feedback), as well as supervisory control. Through these experiments the effectiveness and quality of control were evaluated on the basis of the time required to complete each portion of the task and the type and number of errors which occurred.
Author

N82-34074*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
EVALUATION OF SMART SENSOR DISPLAYS FOR MULTIDIMENSIONAL PRECISION CONTROL OF SPACE SHUTTLE REMOTE MANIPULATOR
A. K. Bejczy, J. W. Brown (NASA. Johnson Space Flight Center), and J. L. Lewis (NASA. Johnson Space Flight Center) *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 607-626 refs (For primary document see N82-34037 24-54)
(Contract NAS7-100)
Avail: NTIS HC A99/MF A01 CSCL 05H

An enhanced proximity sensor and display system was developed at the Jet Propulsion Laboratory (JPL) and tested on the full scale Space Shuttle Remote Manipulator at the Johnson Space Center (JSC) Manipulator Development Facility (MDF). The sensor system, integrated with a four-claw end effector, measures range error up to 6 inches, and pitch and yaw alignment errors within + or 15 deg., and displays error data on both graphic and numeric displays. The errors are referenced to the end effector control axes through appropriate data processing by a dedicated microcomputer acting on the sensor data in real time. Both display boxes contain a green lamp which indicates whether the combination of range, pitch and yaw errors will assure a successful grapple. More than 200 test runs were completed in early 1980 by three operators at JSC for grasping static and capturing slowly moving targets. The tests have indicated that the use of graphic/numeric displays of proximity sensor information improves precision control of grasp/capture range by more than a factor of two for both static and dynamic grapple conditions.
B.W.

N82-34075*# Forschunginstitut fuer Anthropotechnik, Wachtberg (West Germany).
ANALYSIS OF DRIVER PERFORMANCE UNDER REDUCED VISIBILITY
Wolf-Dieter Kaeppler *In* NASA. Ames Research Center 16th Ann. Conf. on Manual Control Jul. 1982 p 630-637 refs (For primary document see N82-34037 24-54)
Avail: NTIS HC A99/MF A01 CSCL 05H

Mathematical models describing vehicle dynamics as well as human behavior may be useful in evaluating driver performance and in establishing design criteria for vehicles more compatible with man. In 1977, a two level model of driver steering behavior was developed, but its parameters were identified for clear visibility conditions only. Since driver performance degrades under conditions of reduced visibility, e.g., fog, the two level model should be investigated to determine its applicability to such conditions. The data analysis of a recently performed driving simulation experiment showed that the model still performed reasonably well under fog conditions, although there was a degradation in its predictive capacity during fog. Some additional parameters affecting anticipation and lag time may improve the model's performance for reduced visibility conditions.
Author

N82-34076*# Texas A&M Univ., College Station. Dept. of Plant Sciences.
AIR POLLUTANT PRODUCTION BY ALGAL CELL CULTURES

Franklin Fong and Edward A. Funkhouser Aug. 1982 33 p refs
(Contract NCC2-102)
(NASA-CR-166384; NAS 1.26:166384) Avail: NTIS HC A03/MF A01 CSCL 06K

The production of phytotoxic air pollutants by cultures of Chlorella vulgaris and Euglena gracilis is considered. Algal and plant culture systems, a fumigation system, and ethylene, ethane, cyanide, and nitrogen oxides assays are discussed. Bean, tobacco, mustard green, cantaloupe and wheat plants all showed injury when fumigated with algal gases for 4 hours. Only coleus plants showed any resistance to the gases. It is found that a closed or recycled air effluent system does not produce plant injury from algal air pollutants. E.A.K.

N82-34077*# California Univ., Berkeley. Dept. of Mechanical Engineering.
APPLICATION OF CONTROL THEORY TO DYNAMIC SYSTEMS SIMULATION
D. M. Auslander, R. C. Spear, and G. E. Young Aug. 1982 68 p refs
(Contract NCC2-67)
(NASA-CR-166383; NAS 1.26:166383; CELSS-16) Avail: NTIS HC A04/MF A01 CSCL 06K

The application of control theory is applied to dynamic systems simulation. Theory and methodology applicable to controlled ecological life support systems are considered. Spatial effects on system stability, design of control systems with uncertain parameters, and an interactive computing language (PARASOL-II) designed for dynamic system simulation, report quality graphics, data acquisition, and simple real time control are discussed. S.L.

N82-34078# Naval Submarine Base, New London, Conn.
COLD WEATHER GOGGLES. PART 3: RESISTANCE TO FOGGING Interim Report
S. M. Luria and David F. Neri 17 May 1982 11 p refs
(M0095PN001)
(AD-A115898; NSMRL-982-Pt-3) Avail: NTIS HC A01/MF A01 CSCL 06/17

Twelve pairs of goggles designed to protect the eyes from conditions in the cold were tested for their tendency to fog while being worn during strenuous exercise in very low temperatures. Subjects reported the visibility of targets of various contrasts during 15-minute periods of exercise. The times at which the different targets became invisible were recorded. There were wide differences between the goggles in their resistance to fogging as revealed by the ability of the subjects to detect the lowest contrast target; these differences declined as target contrast increased. In general, goggles advertised by the manufacturers to be resistant to fogging performed well and were better than goggles by the same manufacturer not so advertised. Author (GRA)

N82-34079# North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Industrial Engineering.
A COMPUTER AIDED WORKSTATION ASSESSOR FOR CREW OPERATIONS - WOSTAS
Babur Mustafa Pulat May 1982 47 p refs
(Contract N00014-81-C-0320)
(AD-A116045) Avail: NTIS HC A03/MF A01 CSCL 09/2

The last decade has witnessed the development of a number of computer aided workplace design and evaluation algorithms. However, none of these models specifically address the problem of designing the work-space of a crew. Multi-Man-Machine Work Area Design and Evaluation System-MAWADES is being developed for this purpose under a multi-year research program. Workstation Assessor - WOSTAS is the first module in MAWADES. WOSTAS is aimed at grouping and/or subdividing activities or tasks of a crew in such a way that all job stations have a fairly equal amount of work in terms of the time to perform the tasks. WOSTAS is a network based model, which accepts mission oriented task requirements of a crew, and generates suggested total number of workstations and the tasks to be carried out at each workstation. The model allows for probabilistic branchings in the mission data. Some of the task assignment criteria built into the model area: each task group should require fairly similar abilities, precedence relationships between tasks should be observed, whenever indicated, user enforced groupings or separations should be met, timewise work-loads should be fairly balanced across the task groups. GRA

N82-34080# ORLOC, Kettering, Ohio.
A SYSTEMS APPROACH FOR CREW STATION DESIGN AND EVALUATION Final Report, 1 Jul. - 31 Dec. 1981
John H. Kearns Wright-Patterson AFB, Ohio AFWAL Feb. 1982 105 p refs
(Contract F33615-81-C-3619; AF Proj. 2403)
(AD-A115663; AFWAL-TR-81-3175) Avail: NTIS HC A06/MF A01 CSCL 01/3

This report documents the development and current status of the Crew Systems Development Branch's (AFWAL/FIGR) methodology for designing and evaluating crew stations for new Air Force aircraft. The report begins with a historical background for the problem area, and then overviews the methodology as employed today. This is followed by a detailed discussion of each of the major stages of the process. The report concludes with a discussion of resources typically involved in cockpit design efforts and a section on crew system testing and evaluation. Also included is a 300 item Bibliography, sampling the more than 10,000 relevant articles, reports and test documentation found in AFWAL/FIGR's Control Display Information Center (CDIC). Author (GRA)

N82-34081# Ohio State Univ., Columbus. Dept. of Psychology.
OPTICAL FLOW AND TEXTURE VARIABLES USEFUL IN SIMULATING SELF MOTION Interim Technical Report, 1 Feb. 1981 - 31 Jan. 1982
Dean H. Owen May 1982 225 p refs
(Grant AF-AFOSR-0078-81)
(AD-A117016; AFOSR-82-0545TR) Avail: NTIS HC A10/MF A01 CSCL 06/16

The project is concerned with: (1) mathematically isolating optical flow and texture variables as candidates for visual information useful is guiding flight maneuvers; and (2) assessing the functional utility of these variables in judgment experiments and in fully interactive simulation environments. The major contribution of the reported year's effort was the development of a technique for holding optical variables invariant throughout self-motion events. The method was used to factorially study fractional rates of change as information for acceleration, deceleration, and loss in altitude. Assessment of individual differences in sensitivity to these optical variables was initiated, and the constraints on degrees of freedom in choosing variables for factorial experimental designs were determined. Optical analysis of 256 Boeing 747 simulator landings has begun to explore the applicability of our approach to flight situations. Studies of this kind will be used to guide future judgment and interactive experiments. Implications of optical analysis for aviation safety are also reported. Lastly, a review of performance measurement in research on visual control of flight is presented. The review will guide our development of optical variables and invariants as measures of performance, under the assumption that pilots make control adjustments in order to control what they perceive.
Author (GRA)

N82-34082# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
BLUE FLIGHT COVERALL PROGRAM Final Report
Jules Z. Lewyckyj Dec. 1981 17 p
(AD-A116856; NADC-82074-60) Avail: NTIS HC A02/MF A01 CSCL 06/17

Presently used Flight Coveralls (CWU-27/P) are sage green. New Coveralls were manufactured from blue aramid to provide for a choice in color. These suits were given a special evaluation by operational squadrons. Although the suits were made from a heavy gabardine (the only fabric available in blue at the time of manufacture) which was somewhat uncomfortable in hot weather, the Coverall in general was satisfactory. A proposal is now being

evaluated to manufacture and retest Coveralls using a lighter weight blue fabric. Author (GRA)

N82-34083# Army Research Inst. of Environmental Medicine, Natick, Mass.

MICROCLIMATE COOLING FOR COMBAT VEHICLE CREWMEN

Ralph F. Goldman 18 Jun. 1982 14 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117156) Avail: NTIS HC A02/MF A01 CSCL 06/19

Several XM-1 tanks were available to study the heat stress/CW protection problem under desert conditions. A six day test was carried out; the first two days were for training, and resolving problems; the last four days comprised the data generating portion of the trial. Day 3 involved wearing the fully closed CW clothing system over the CVC uniform (MOPP IV); the vehicle hatches were left open, but the engine and ventilators were shut off. MOPP IV was also worn on the final three days of the study; the engine and ventilators were shut off and all hatches closed on these three days. Significant heat stress was demonstrated, at a level to produce early performance decrements and eventually, subjective inability to continue; this was fully supported by physiological data as being a valid endpoint for performance capability. In conclusion, we have identified a clear mismatch between the ability of a crewman dressed in CW protective clothing and the simple demand that he perform an extremely light fire mission when ambient conditions (expressed as the WBGT) are in the 32 to 35 C (90 to 95 F) range. These occurred inside the XM-1 only when the hatches were closed and the blowers shut off. GRA

N82-34084# Naval Biodynamics Lab., New Orleans, La.

REPEATED MEASURES OF HUMAN PERFORMANCE: A BAG OF RESEARCH TOOLS

Alvah C. Bittner, Jr. and Robert C. Carter Nov. 1981 26 p refs (AD-A113954; NBDL-81R011) Avail: NTIS HC A03/MF A01 CSCL 06/19

Research tools are described which are applicable to repeated measures of human performance. In the first section, statistical criteria for tasks are delineated, tools for assessment are described, and examples of applications are given. In the second section, multiple subject and single subject analyses of intervention experiments are considered with major focus on the methodological tools. The final section summarizes these tools with examples of their application. Author (GRA)

N82-34085# Federal Aviation Administration, Washington, D.C. Systems Research and Development Service.

EVALUATION OF FOUR-COLOR PLAN VIEW DISPLAY CONSOLE Final Report, Jun. 1978 - Oct. 1981

John W. Aschenbach, Alan J. Kopala, and Lauren N. Douglass, Jr. Jun. 1982 93 p refs

(AD-A117897; DOT/FAA/RD-82/46) Avail: NTIS HC A05/MF A01 CSCL 09/2

Technical and operational evaluations were conducted on Plan View Displays (PVDs) modified for both four-color and monochrome presentation. Two of six PVDs modified for color were tested and evaluated for display performance at the Federal Aviation Administration (FAA) Technical Center in Atlantic City, New Jersey. Data were collected on brightness and resolution, power consumption, color registration, character legibility and position accuracy, and distortion in the broadband or 'TV' mode. A registration board failure analysis, a maintainability analysis, and a radio frequency radiation survey were also performed. All six color PVDs were subjectively evaluated for operational suitability at the Washington Air Route Traffic Control Center (ARTCC) in Leesburg, Virginia. Data were collected to determine controller's reactions on the operational use of multicolor PVDs from questionnaires and taped interviews. Author (GRA)

N82-34086# Army Research Inst. of Environmental Medicine, Natick, Mass.

LOW TEMPERATURE TESTS OF RESCUE BREATHING APPARATUS Final Report, Sep. 1978 - Dec. 1980

Richard L. Burse and Louis D. Strong Jul. 1981 114 p

(Contract DI-BM-J0-188026)

(PB82-172727; BM-OFR-16-82) Avail: NTIS HC A10/MF A01 CSCL 06K

Two samples of three different types of rescue breathing apparatus (RBA) were tested to determine how long both could be worn by operators in subfreezing temperatures. Phase 1 tests were performed after overnight cold soaking at the test temperature; phase 2 tests were performed after overnight storage at + 20C. Successful performance was determined as proper operation for at least one-half the certified duration of the oxygen supply without either exhaustion of the oxygen supply, increase of inspired CO2 above physiologically acceptable levels, or increase in breathing resistance above tolerable levels. In phase 1, the Scott 'Rescue Pak(R)' operated successfully at 20C, while the Drager 174-A and the McCaa units operated successfully at -10C. In phase 2, the Scott unit operated successfully at -25C, the Drager at -20C, and the McCaa at -15C. None of the RBA types appeared well-designed for use in subfreezing temperatures. GRA

N82-34087# Coast Guard Research and Development Center, Groton, Conn.

A PILOT STUDY OF HUMAN FACTORS IN SAR Interim Report, Apr. 1980 - May 1982

D. I. Remondini, M. Light, M. L. Everson, L. Nash, and D. L. Good May 1982 70 p refs

(AD-A117917; CGR/DC-5/82; USCG-D-19-82) Avail: NTIS HC A04/MF A01 *CSCL 05/5

During three visual detection experiments, the USCG R&D Center collected human factors information. Various human factor parameters thought intuitively to affect the performance of a lookout were measured and analyzed. These included experience level, time on watch, amount of sleep, and lookout position. In addition, Hidden Pattern and Figure Tests were administered to the lookout subjects in these studies. This report presents the results of this pilot study. Lookout subjects from HH-3F and HH-52A helicopters, 82-ft patrol boats (WPBs), 210-ft medium endurance cutters (WMECs), and 41-ft small utility boats (UTBs) were included. Time on watch was found to have a marked influence on performance of lookouts on surface units. A marginal relationship was found between test scores and performance. Data from an experiment dedicated to human factors parameters is necessary for a proper investigation. Author (GRA)

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N82-34088# Planning Research Corp., McLean, Va. Government Information Systems.

IMPROVED MICROPROCESSOR DESIGN Final Technical Report, May 1980 - May 1981

L. E. Klet, R. E. Crandall, J. H. Glende, M. A. Okulski, and J. E. Simpson Griffiss AFB, N.Y. RADC Oct. 1981 186 p

(Contract F30602-80-C-0171; AF Proj. 4594)

(AD-A110858; PRC-R-3412; RADC-TR-81-273) Avail: NTIS HC A09/MF A01 CSCL 09/2

The technical improvements proposed to provide an improved Micro Programmable Controller (MPC) are detailed. The MPC is an innovative combination of hardware and software, synergistically coupled, to produce a truly distributed computer system. The hardware consists of an array of micro-computer subsystems called ports which communicate with each other via a high speed, bidirectional, asynchronous exchange bus. These ports are capable of communicating externally via an I/O hardware interface which supports various serial protocols, such as the DDCMP. The objective of these technical design improvements was to enhance the performance of the Microprogrammable Controller (MPC) without altering its basic architectural characteristics by redefining the implementation of certain logical control elements and by migrating to hardware some control features currently accomplished in firmware. The Bus Interface Electronics and Bus Controller were redesigned to provide greater bus and port to port bandwidth. The Inter-Bus Link (IBL) was designed to efficiently transfer bus cycles between physically isolated exchanged busses (SSBUS). Finally, the existing MPC system level firmware was redesigned to operate the improved MPC. Author

N82-34089# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.

THE GEORGIA INSTITUTE OF TECHNOLOGY RESEARCH PROGRAM IN FULLY DISTRIBUTED PROCESSING SYSTEMS Quarterly Progress Report, 1 Dec. 1981 - 28 Feb. 1982

Mar. 1982 12 p refs

(Contracts N00014-79-C-0873; F30602-78-C-0120; F30602-81-C-0249; DAAG29-79-C-0155; Grant NSF MCS-79-24370; GIT Proj. G36-643; GIT Proj. G36-654; GIT Proj. G36-659; GIT Proj. G36-638; GIT Proj. G36-652)

(AD-A116955; QPR-10) Avail: NTIS HC A02/MF A01 CSCL 09/2

The Georgia Tech Research Program in Fully Distributed Processing Systems is a comprehensive investigation of data processing systems in which both the physical and logical components are extremely loosely coupled while operating with a high degree of control autonomy at the component level. The definition of the specific class of multiple computer systems being investigated, and the operational characteristics and features of those systems are motivated by the desire to advance the state-of-the-art for that class of systems that will deliver a high proportion of the benefits currently being claimed for distributed processing systems. The scope of individual topics being investigated under this program ranges from formal modeling and theoretical studies to empirical examinations of prototype systems and simulation models. Also included within the scope of the program are areas such as the utilization of FDPS's and their interaction with management operations and structure.

Author (GRA)

N82-34090# Minnesota Univ., Minneapolis. Dept. of Computer Science.

NEARLY ON LINE SCHEDULING OF MULTIPROCESSOR SYSTEMS WITH MEMORIES

Ten-Hwang Lai and Sartaj Sahni Apr. 1982 18 p refs

(Contract N00014-80-C-0650)

(AD-A116823; TR-82-11) Avail: NTIS HC A02/MF A01 CSCL 09/2

We show that no multiprocessor system that contains at least one processor with memory size smaller than at least two other processors can be scheduled nearly on line to minimize the finish time. An efficient nearly on line algorithm to minimize C-sub-max is developed for multiprocessor systems that do not satisfy the preceding requirement. Finally, we review the complexity of some other scheduling problems for multiprocessor systems with memories. Author (GRA)

N82-34091# Rockwell International Science Center, Thousand Oaks, Calif. Microelectronics Research and Development Center.

ADVANCED ON-BOARD SIGNAL PROCESSOR GALLIUM ARSENIDE MEMORY Semiannual Technical Report, 21 Jul. 1981 - 20 Jan. 1982

B. M. Welch, Ricardo Zucca, R. Vahrenkamp, and G. R. Kaelin Jun. 1982 69 p refs

(Contract MDA903-81-C-0126; DARPA Order 4100)

(AD-A117151; MRDC41083.18TR; SATR-2) Avail: NTIS HC A04/MF A01 CSCL 09/2

This report covers the second two quarters of the AOSP Memory Program. The program is focused on the development of a low power GaAs static memory technology capable of 4K bit complexity levels. During this reporting period work continued on RAM arrays using two mask sets; the first mask set (AP1) was used for preliminary RAM cell design analysis as well as for verification of layout rules. The second mask set (RM2), using the data from AP1, focused on the design, fabrication, and evaluation of 256 bit RAMS. Processing techniques for incorporation of megohm CERMET resistors, and control of the required lower voltage were successfully demonstrated. Testing of single RAM cells, both with external and on-chip resistors, verified cell operation, established operating windows, and demonstrated the effects of resistor non-uniformities. Preliminary yield analysis for the first four wafers (224 bit undecoded arrays) showed a failure rate of approx. 1% and a circuit yield of approx. 10%.

Author (GRA)

N82-34092# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.

A VERSION OF THE GRAPHICS-ORIENTED INTERACTIVE FINITE ELEMENT TIME-SHARING SYSTEM (GIFTS) FOR AN IBM WITH CP/CMS M.S. Thesis

Ronnie Hundley Mar. 1982 97 p refs

(AD-A116798) Avail: NTIS HC A05/MF A01 CSCL 09/2

A version of the Graphics-oriented, Interactive, Finite element, Time-sharing System (GIFTS) has been developed for, and installed on, an IBM computer with the Conversational Monitor System (CMS). GIFTS, developed at, and available from the Interactive Graphics Engineering Laboratory of the University of Arizona, is an extensive code for static, transient, modal, and constrained substructural analysis of three dimensional truss, plate, shell, and solid finite element models. A brief description of GIFTS, including insights into its logic and structure necessary to the version's development, and an in-depth description of the method used to invoke CMS commands from the executing program for the purpose of data base management are provided. The version, making use of the Tektronix 4000 series graphics terminals, is self-contained and portable, allowing its installation on other IBM computers with the CMS operating system. Author (GRA)

N82-34093# Aberdeen Proving Ground, Md.

DATA COMPRESSION FOR TRANSIENT MEASUREMENTS

Samuel F. Harley 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117100) Avail: NTIS HC A02/MF A01 CSCL 09/2

Data compression can be defined as the elimination of redundant data samples. Such techniques as the extraction of the mean and standard deviation, the root-mean-square (RMS), or other statistical measures such as histograms are certainly compressive in nature, but for the purposes of this presentation only those processes which allow the reconstruction of the time history of the original signal will be considered. Experimenters can be very protective of data collected during their experiments and often resist any effort to eliminate redundant data samples. The inclusion of nonintelligence bearing data, however, can impose unacceptable burdens on data acquisition and processing systems,

and can thus slow the testing process and inhibit productivity. The compression algorithm described here provides a modest compression ratio while maintaining the fidelity of the reconstructed signal. The use of these techniques decreases the requirements for both dedicated off-board data memory and processor memory, for test site mass storage, and for archival storage. GRA

N82-34094# Michigan Univ., Ann Arbor. Systems Engineering Lab.
VECTORIZED SPARSE ELIMINATION
D. A. Calahan 15 Apr. 1982 12 p refs
(Grant AF-AFOSR-0158-80; AF Proj. 2304)
(AD-A117112; AFOSR-82-0553TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

Single topic of general sparse matrix solution using scalar processors may be broken into specialized areas of study when implementation on vector architectures is considered. First, highly sparse matrices, usually represented ODE/algebraic-modeled systems, are easily decoupled by re-ordering. At a minimum, locally-decoupled equations may be solved in pipelined scalar mode; if the decoupled subsystems can be arranged (a) to have identical sparsity, and (b) to be stored a constant stride apart, then a simultaneous sparse solver may be invoked and a vector solution obtained. As sparse systems become locally coupled - as occurs in finite element and finite difference problems - then vectors are easily defined within the coupled subsystems. It is worth making a further distinction between: (a) intra-nodal or intra-element coupling, where the dimension of dense submatrices is proportional to the number of unknowns/node or unknowns/finite element, and (b) inter-nodal or inter-element, where the coupling between grid nodes or finite elements determines the vector length. Banded and profile matrices result from the latter. The associated vector lengths are the products of the number of unknown/node (element) and the number of coupled nodes. These lengths are therefore always longer than in the former case, so that common bandsolvers offer the highest performance of any sparse solvers. GRA

N82-34095# Woods Hole Oceanographic Institution, Mass. Dept. of Ocean Engineering.
COMPUTER STORAGE AND RETRIEVAL OF POSITION: DEPENDENT DATA M.S. Thesis
Robert Carl Groman Jun. 1982 140 p refs
(Contracts N00014-79-C-0071; N00014-82-C-0019; NR Proj. 083-004)
(AD-A116767; WHOI-82-27) Avail: NTIS HC A07/MF A01 CSCL 09/2

A data storage and retrieval scheme has been designed and implemented which provides cost effective and easy access to location-dependent, 'geophysical' data. The system is operational on a Digital Equipment Corporation VAX-11/780 computer. Values of measured and computed geophysical parameters, such as geomagnetic field, water depth and gravity field, are stored in the library system. In addition, information about the data, such as port stops, project name and funding agency are also saved. These data are available to a time sharing computer uses, validated to use the software package, through a query language designed to interact with this data library. The data can be searched and retrieved both sequentially and geographically. GRA

N82-34096# Virginia Polytechnic Inst. and State Univ., Blacksburg. Computer Science Industrial Engineering/Operations Res.
THE DMS MULTIPROCESS EXECUTION ENVIRONMENT
Roger W. Ehrich Apr. 1982 43 p refs
(Contract N00014-81-K-0143; RR0420901)
(AD-A117660; CSIE-82-6) Avail: NTIS HC A03/MF A01 CSCL 09/2

In this report a language-independent multiprocessing environment for managing human-computer dialogue is described. One of the main reasons for such an environment is that it helps to enforce the separation of modules that deal with human-computer dialogue from those that deal with computation while at the same time providing for concurrencies that would not otherwise be possible. Embedded in the environment are debugging aids that facilitate software preparation and a priority mechanism for sequencing interprocess communications. Author (GRA)

N82-34097# Naval Postgraduate School, Monterey, Calif.
DISTRIBUTED VERSUS CENTRALIZED DATABASE SYSTEMS: TRANSACTION EXECUTION COST AND PERFORMANCE ANALYSIS
Dushan Z. Badal Jul. 1982 27 p refs
(AD-A117915; NPS52-82-007) Avail: NTIS HC A03/MF A01 CSCL 09/2

The purpose of this paper is twofold. First, we investigate the impact of concurrency control on transaction execution cost and system throughout in centralized and distributed data base systems (DBS) based on slow and fast (local) networks. Second, we show that in terms of transaction execution cost and DBS throughput, there are some applications for which any distributed DBS can be more effective than any centralized DBS and vice versa. We also argue that for other applications the decision in favour of distributed or centralized DBS should be based on the comparison of specific DBS systems. Author (GRA)

N82-34098# Massachusetts Inst. of Tech., Cambridge. Computation Structures Group.
DATA FLOW COMPUTER ARCHITECTURE Annual Technical Progress Report
J. B. Dennis 1982 17 p refs Sponsored in part by NSF
(Contract DE-AC02-79ER-10473)
(DE82-014632; DOE/ER-10473/1) Avail: NTIS HC A02/MF A01

Progress in research on data flow computer architecture is reported. The following are discussed: design and documentation of the programming language VAL as a high level programming language for programs to be executed on data flow computers; construction of an engineering model and a hardware system for the evaluation of proposed architectures of data flow computers; design and implementation of procedures for translating the constructs of VAL into data flow machine language; development of promising approaches to handling the data structures of large numerical computations; analysis of several application problems for their suitability for efficient execution on data flow computers; and exploration of design methodologies for packet architectures and development of preliminary specifications and designs for several basic units of data flow computers. The specific theoretical characterization of data flow languages and computations and packet communication architectures were investigated. DOE

N82-34099# Computer Corp. of America, Cambridge, Mass.
AN ARCHITECTURE FOR DATABASE MANAGEMENT STANDARDS Final Report
Jan. 1982 57 p refs
(Contract NB-79-SBC-0086)
(PB82-176322; NBS-SP-500-86; LC-81-600174) Avail: NTIS HC A04/MF A01 CSCL 09B

The current status of project on architectures for database management systems (DBMS) is presented. An architectural framework for developing DMBS standards is presented. It addresses requirements of both the Federal data processing community and the DBMS vendor community. The architecture groups DBMS functions into both internal and external components and for these components is proposed a family structure which supports the integration of DBMS standards for multiple data models. GRA

N82-34100# Federal Compiler Testing Center, Falls Church, Va.
UNITED COMPUTING SYSTEMS, INC. CYBER 730, CDC COBOL 5.3 LEVEL 528
30 Sep. 1981 78 p
(PB82-169509; FCTC-81-107) Avail: NTIS HC A05/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the United Computing Services, Inc. CDC COBOL 5.3 running under the APEX D.4.2 operating system provides a consolidated summary of the results obtained from the validation of the subject compiler against the

1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the HIGH level of FIPS PUB21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. Author

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-34101# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
COMPUTER-AIDED DESIGN, DRAWING AND MANUFACTURING SYSTEM FOR DIES AND MOLDS
T. Mori and M. Yasuda 1982 47 p Trans. into ENGLISH from Natl. Tech. Rept. (Matsushita Elec. Ind. Co., Osaka), v. 24, no. 6, 1978 p 1046-1056
(NRC/CNR-TT-2030; ISSN-0077-5606) Avail: NTIS HC A03/MF A01

A computer-aided system for designing, drawing, and manufacturing molds and dies and for conducting control operations was developed. This system makes it possible to save labor and shorten the delivery time for molds and dies by making operations simpler and more flexible, resulting in increased efficiency in the design, manufacturing and control phases of production. Features that assist in the design, drawing and numerically controlled machining of these types of molds and dies are emphasized. Author

N82-34102*# Beam Engineering, Inc., Sunnyvale, Calif.
ENSEMBLE AVERAGING OF ACOUSTIC DATA
Patricia K. Stefanski Sep. 1982 64 p ref
(NASA Order A-88065-B)
Avail: NTIS HC A04/MF A01 CSCL 09B

A computer program called Ensemble Averaging of Acoustic Data is documented. The program samples analog data, analyzes the data, and displays them in the time and frequency domains. Hard copies of the displays are the program's output. The documentation includes a description of the program and detailed user instructions for the program. This software was developed for use on the Ames 40- by 80-Foot Wind Tunnel's Dynamic Analysis System consisting of a PDP-11/45 computer, two RK05 disk drives, a tektronix 611 keyboard/display terminal, and FPE-4 Fourier Processing Element, and an analog-to-digital converter. B.W.

N82-34103# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
WEAPON SYSTEM SOFTWARE ACQUISITION AND SUPPORT: A THEORY OF SYSTEM STRUCTURE AND BEHAVIOR M.S. Thesis
Bradford D. Mercer Mar. 1982 196 p refs
(AD-A115555; AFIT/GCS/MA-82M-3) Avail: NTIS HC A09/MF A01 CSCL 09/2

The system for acquiring and supporting weapon system software was investigated through the methodology of system dynamics, a technique for studying the structure of socio-technical systems and how that structure determines their behavior. Conceptual and mathematical models of a generalized software production process and the influences upon that process were developed. The mathematical model was translated into a continuous simulation computer model using the DYNAMO language. These models can be examined by managers at all levels in the acquisition and support process in order to increase their understanding of the complexities and interactions of system decisional structures. Such understanding is foundational to the analysis and formulaton of policy to guide and improve the performance of that management system. GRA

N82-34104# Massachusetts Inst. of Tech., Cambridge. School of Management.
VIRTUAL INFORMATION FACILITY OF THE INFOPLEX SOFTWARE TEST VEHICLE, PART 1
Jameson Lee May 1982 192 p refs
(Contract N00039-81-C-0663)
(AD-A116502; M010-8205-10-Pt-1; TR-10-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 09/2

This report describes the software design and implementation of the front-end for the Virtual information facility of the INFOPLEX database computer. It is part of a major effort to develop a software simulation, called Software Test Vehicle, for the underlying architecture of INFOPLEX. The virtual information facility is a single level of operations situated within the Functional Hierarchy. It supports the use of virtual information, a virtual entity based on procedural relationships and derivations from physically recorded data. Upon completion, this facility will be integrated within the current implementation of the STV for the INFOPLEX Functional Hierarchy which lacks the support for virtual information processing. Author (GRA)

N82-34105# Massachusetts Inst. of Tech., Cambridge. School of Management.
VIRTUAL INFORMATION FACILITY OF THE INFOPLEX SOFTWARE TEST VEHICLE, PART 2
Peter Lu May 1982 148 p refs
(Contract N00039-81-C-0663)
(AD-A116503; M010-8205-11-Pt-2; TR-11-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 09/2

This report describes the software design and implementation of the rear-end for the Virtual Information Facility of the INFOPLEX database computer. It is part of a major effort to develop a software simulation, STV, for the underlying architecture of INFOPLEX. The virtual information facility is a single level of operations situated within the Functional Hierarchy. It supports the use of virtual information, a virtual entity based on procedural relationships and derivations from physically recorded data. Upon completion, this facility will be integrated within the current implementation of the STV for the INFOPLEX Functional Hierarchy which lacks the support for virtual information processing. GRA

N82-34106# Creusot-Loire, Paris (France).
AN EXAMPLE OF THE EFFECT OF HYDROGEN TRAPPING ON HYDROGEN EMBRITTLEMENT
G. M. Pressouyre and I. M. Bernstein (Carnegie-Mellon Univ., Pittsburgh) 16 Jan. 1980 14 p refs
(Contract N00014-75-C-0265; NR Proj. 036-099)
(AD-A116299; CMU-036-099-14; TR-14) Avail: NTIS HC A02/MF A01 CSCL 09/2

The role of internaly hydrogen in reducing the tensile reduction of area of iron-titanium alloys is examined. The population of hydrogen at potential crack nucleii is shown to be controlled by its dynamic interaction with mobile dislocations and its subsequent transport to fixed traps. Expression are developed for both the number of hydrogen atoms at a given irreversible trap, as well as the time necessary to reach such a number. Reducing the number below the critical value to nucleate a crack, or increasing the time to reach this value will improve an alloy's performance, and this improvement is related to controllable external and metallurgical variables. These predictions of the model are shown to be consistent with companion experimental data, and with the trap theory of hydrogen embrittlement. Author

N82-34107# General Electric Co., Lanham, Md. Space Systems Div.
INTERACTIVE DIGITAL IMAGE PROCESSING FOR TERRAIN DATA EXTRACTION Final Report, Oct. 1981 - May 1982
Thomas F. Wescott and William C. Dallam May 1982 143 p
(Contract DAAK70-79-C-0153)
(AD-A116881; ETL-0294) Avail: NTIS HC A07/MF A01 CSCL 09/2

The Phase 3 of an experimental study has been performed to test several man-machine interactive digital image processing

techniques for the extraction of forest related information including the outline of forested areas, tree stem location, tree stem densities and canopy closure. The techniques were applied to several different images covering a considerable range of forest types. Results of the digital processing were compared to a manual photo-interpretation and to actual field measurements.
Author (GRA)

N82-34108# Purdue Univ., Lafayette, Ind. Dept. of Computer Sciences.
EXPERIMENTAL INVESTIGATION OF PROGRAMMING COMPLEXITY IN COBOL Final Report, 9 Sep. 1979 - 8 Mar. 1982
H. E. Dunsmore and Dennis Volpano May 1982 27 p refs
(Contract DAAG29-79-C-0173)
(AD-A116811; ARO-16758.1-EL-A) Avail: NTIS HC A03/MF A01 CSCL 09/2

This study investigated programming activity in COBOL. Attempts were made to identify problem areas so that improvements can be made in COBOL compilers and in the manner in which COBOL is taught. Identification of problem areas was achieved through examining program changes made by student programmers during the development of four different COBOL programs. The data, which was collected from a COBOL course at Purdue University, consisted of all versions of all programs submitted for compilation by each student. Author (GRA)

N82-34109# Systems Architects, Inc., Randolph, Mass.
IMPROVING SOFTWARE QUALITY ASSURANCE METHODS Final Technical Report, 21 Aug. 1980 - 21 Dec. 1981
James J. Davlin and Margaret Weedon Apr. 1982 133 p
(Contract F30602-80-C-0252; AF Proj. 2531)
(AD-A116980; RADC-TR-82-106) Avail: NTIS HC A07/MF A01 CSCL 05/1

This effort was coordinated among Rome Air Development Center (RADC), Defense Logistics Agency Headquarters (DLA Hq), Air Force Contracts Management Division Headquarters (AFCMD Hq), and Electronic Systems Division (ESD). System Architects, Inc. (SAI) performed this effort and has examined, analyzed, and evaluated the current software acquisition and contract administration management documents, software quality assurance tools, techniques and communication methods and has developed a series of recommendations for improved methods for assuring quality software. These improved methods encompass the entire software development life cycle which consists of five phases: (1) Requirement Analysis, (2) Design, (3) Code and Checkout, (4) Test and Integration, and (5) Operation and maintenance. SAI examined relevant documentation, conducted interviews and compiled the results from a comprehensive questionnaire as the basis for the analysis, evaluation and recommendations which can be found herein. SAI's recommendations for improved methods of assuring quality software are classified in four groups: (1) Establish clear, unambiguous Government Software Quality Assurance Guidance Documents, (2) Includes Software Quality Assurance Functions in all phases of the Software Development Life Cycle, (3) Improve communication methods and model documents primarily by mutual agreement regarding allocation of functional responsibilities between CAO's and Program Offices, and (4) Provide up-to-date training and people skilled in software to government SQA organizations. GRA

N82-34110# Maryland Univ., College Park. Computer Vision Lab.
CELLULAR ARCHITECTURES FOR PATTERN RECOGNITION
Azriel Rosenfeld Apr. 1982 27 p refs
(Grant AF-AFOSR-3271-77; AF Proj. 2304)
(AD-A117049; AFOSR-82-0559TR; TR-1151) Avail: NTIS HC A03/MF A01 CSCL 09/2

Cellular computers - arrays of processors each of which can communicate with their neighbors - were proposed nearly 25 years ago as natural computational structures for image processing and recognition. Several such processor arrays, containing up to 128 by 128 processors, have actually been constructed. This article reviews basic methods of image processing using cellular arrays, and also discusses some possible extensions and generalizations. Author (GRA)

N82-34111# Massachusetts Inst. of Tech., Cambridge. Man-Machine Systems Lab.
COMPUTER GRAPHIC REPRESENTATION OF REMOTE ENVIRONMENT USING POSITION TACTILE SENSORS M.S. Thesis
Donald Charles Fyler Aug. 1981 137 p refs
(Contract N00014-77-C-0256)
(AD-A116912) Avail: NTIS HC A07/MF A01 CSCL 17/8

The usefulness of remotely controlled manipulators is increasing as the need grows to accomplish complex tasks in hazardous environments such as the deep ocean. The best sensory input currently available to the operator of a remote supervisory controlled manipulator is a television picture of the manipulator and its surroundings. Very often, though, optical opacity due to suspended particles in the water can make television impractical or impossible to use. This report investigates the use of touch sensors to construct a picture of the manipulator surroundings. One method studied was to find 3-dimensional surface points and show them on a computer graphic display. An extension of this was to reconstruct the surface of these points with the aid of a computer. GRA

N82-34112# Rensselaer Polytechnic Inst., Troy, N. Y. Image Processing Lab.
OCTREE GENERATION, ANALYSIS AND MANIPULATION
Donald Meagher Apr. 1982 149 p refs
(Contract N00014-82-K-0301)
(AD-A117450; IPL-TR-027) Avail: NTIS HC A07/MF A01 CSCL 09/2

Octree Encoding is a solid modeling method designed for the high-speed manipulation, analysis and display of arbitrary 3-D objects. The technique is based on a hierarchical 8-ary tree or octree for object representation. Octree Encoding is presented and analyzed along with a discussion of the major considerations involved in its development. Techniques for the efficient conversion into octrees of convex polyhedra and restricted analytic objects are presented. Strategies for unrestricted and concave object conversion are also discussed. Algorithms for the measurement of object properties (volume, surface area, center of mass, moment of inertia, segmentation of disjoint parts, number of interior voids and a correlation between two objects), geometric operations (translations, scaling, rotation, concatenated geometric operations, nonlinear operations and perspective transformation) and rotational swept volume are developed. Author (GRA)

N82-34113# Arizona Univ., Tucson. Engineering Experiment Station.
A SUMMARY DISCUSSION OF CONLAN Final Report
Frederick J. Hill 15 Jul. 1982 49 p refs
(Contract N00014-79-C-0368; NR Proj. 048-656)
(AD-A117461) Avail: NTIS HC A03/MF A01 CSCL 09/2

CONLAN is a proposed family of standard hardware description languages developed by a six person international working group. It stresses strong typing and formal semantic development so that the results of simulation at different language levels can be formally checked. This project funded a small portion of the CONLAN development including the writing of the CONLAN introduction contained herein. This introduction will be adapted to form the first chapter of the overall CONLAN report to be published by SpringerVerlaag. GRA

N82-34114# Stanford Univ., Calif. Systems Optimization Lab.
USERS GUIDE FOR SOL/QPSOL: A FORTRAN PACKAGE FOR QUADRATIC PROGRAMMING
Philip E. Gill, Walter Murray, Michael A. Saunders, and Margaret H. Wright Jun. 1982 35 p refs
(Contracts DAAG29-81-K-0156; DAAG29-79-C-0110; DE-AT03-76ER-72018; DE-AM03-76SF-00326; Grants NSF ECS-79-26009; NSF ECS-80-12974)
(AD-A117607; SU-SOL-82-7; ARO-18424.7-MA) Avail: NTIS

HC A03/MF A01 CSCL 12/1

This report forms the user's guide for SOL/QPSOL, a set of FORTRAN subroutines designed to locate the minimum value of an arbitrary quadratic function subject to linear constraints and simple upper and lower bounds. If the quadratic function is convex, a global minimum is found; otherwise, a local minimum is found. The method used is most efficient when many constraints or bounds are active at the solution. The subroutines are not intended for large sparse problems, but they will be useful for problems with up to several hundred variables and relatively few general constraints. Author (GRA)

N82-34115# Mitre Corp., Bedford, Mass.
ANALYSIS OF INTERACTIVE GRAPHICS DISPLAY EQUIPMENT FOR AN AUTOMATED PHOTO INTERPRETATION SYSTEM
E. J. McLaughlin Jun. 1982 41 p refs
(Contract F19628-82-C-0001)
(AD-A117647; MTR-8224; ESD-TR-82-134) Avail: NTIS HC A03/MF A01 CSCL 14/2

Off-the-shelf interactive graphics display systems were analyzed relative to the Foreign Technology Division's (FTD's) photo analysis process. Standalone and cluster display systems were evaluated for their effectiveness in constructing engineering drawings and generating reports. The Evans and Sutherland Multi-Picture System is a representative candidate for FTD use based upon performance and cost considerations. Author (GRA)

N82-34116# Sandia Labs., Albuquerque, N. Mex.
XERROR: THE SLATEC ERROR-HANDLING PACKAGE
Rondall E. Jones and David K. Kahaner (NBS, Washington, D.C.) May 1982 23 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015494; SAND-82-0800) Avail: NTIS HC A02/MF A01

The XERROR package, a collection of portable Fortran routines for processing of errors that occur in other routines, is described. It was developed as the error-handling package for the SLATEC Common Mathematical Library, which is in use at a number of DOE and other facilities. The use of the package is described from the viewpoint of the writer of library routines which need to call the XERROR package to handle errors, and from the viewpoint of the user of those library routines. DOE

N82-34117# Oak Ridge National Lab., Tenn. Computer Sciences Div.
STORAGE-EFFICIENT METHOD FOR CONSTRUCTION OF A THIESSEN TRIANGULATION
Robert J. Renka May 1982 91 p refs
(Contract W-7405-eng-26)
(DE82-014571; ORNL/CSD-101) Avail: NTIS HC A05/MF A01

A firm theoretical foundation is established for triangulation algorithms. A storage-efficient method and associated software for constructing and representing a triangulation of arbitrarily distributed points in the plane are described. DOE

N82-34118# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
NONALGEBRAIC SYMBOL MANIPULATORS FOR USE IN SCIENTIFIC AND ENGINEERING MODELING: INTRODUCING THE FORSE (FORTRAN SYMBOL EXPANDER)
Joel H. Schultz and Jonathan D. Lettvin Feb. 1982 33 p refs
(Contract DE-AC02-78ET-51013)
(DE82-009818; DOE/ET-51013/31; PFC/RR-82-4) Avail: NTIS HC A03/MF A01

A system of nonalgebraic symbol manipulators, called the FORSE (FORTRAN symbol expanders) was developed to document and prepare input-output for Fortran programs. The use of documentation at the level of the individual equation is defined. The operation of the FORSE is described, along with user instructions and a worked example. DOE

N82-34119# Fondazione Ugo Bordoni, Rome (Italy).
A NOTE ON COPE: A SOFTWARE TOOL FOR MODELING AND EVALUATING THE PERFORMANCE OF COMPUTING SYSTEMS
Heinz Beilner (Dortmund Univ., West Germany) and Davide Grillo May 1982 45 p refs
(FUB-7-1982) Avail: NTIS HC A03/MF A01

The philosophy and the main capabilities of a computer performance evaluator (COPE) program are pointed out. The program operates on networks of queues that model both the architecture of the system to be evaluated and the mechanisms of resource allocation to competing demands which take place in that system. The modelling undergoes three main stages: network specification, workload specification and result specification. The model description is eased by a language specially conceived to the scope that also enables the user to edit changes in the system specifications and/or in the metrics production. Author (ESA)

N82-34120# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
INTERNATIONAL BUSINESS MACHINES CORPORATION, IBM SERIES/1 COBOL 5719-CB7 VERSION 2 LEVEL 0 (COBOL TECHNICAL REPORT)
31 Aug. 1981 14 p
(PB82-155342; FCTC-81-30; FCTC-81-100) Avail: NTIS HC A02/MF A01 CSCL 09B

A validation summary report (VSR) for the IBM Series/1 Host COBOL compiler (5799 TEL PRPQ P82648) Version 2 Level 0 running under the OS/VS MVS Release 3.8 and the realtime programming system (RPS) Version 5 Level 1 providing a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1) is presented. The compiler was valided against the Low Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N82-34121# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
INTERNATIONAL BUSINESS MACHINES CORPORATION, IBM SERIES/1 HOST COBOL 5799 TEP, PRPQ P82648 VERSION 2 LEVEL 0 (VALIDATION SUMMARY REPORT)
31 Aug. 1981 50 p
(PB82-155359; FCTC-81-102) Avail: NTIS HC A03/MF A01 CSCL 09B

The Indexed I-O Level 1 and Sort-Merge Level 1 modules of the IBM Series/1 57-19-CB7 COBOL Compiler Version 2 Level 0 running under the realtime programming system (RPS) Version 5 Level 1 were evaluated. A consolidated summary of the results obtained from the evaluation of the subject compiler against the indexed I-O Level 1 and Sort-Marge Level 1 modules of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1) is presented. Several sections showing all the discrepancies found are presented. GRA

N82-34122# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
INTERNATIONAL BUSINESS MACHINES CORPORATION, IBM SERIES/1 COBOL 5719-CB7 VERSION 2 LEVEL 0 (VALIDATION SUMMARY REPORT)
31 Aug. 1981 50 p
(PB82-155367; FCTC-81-100) Avail: NTIS HC A03/MF A01 CSCL 09B

A validation summary report (VSR) for the IBM Series/1 COBOL compiler (5719-CB7) Version 2 Level 0 running under the realtime programming system (RPS) Version 5 Level 1, providing a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1) is presented. The compiler was validated against the Low Intermediate level of FIPS PUB 21.1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the

validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N82-34123# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
INTERNATIONAL BUSINESS MACHINES CORPORATION, IBM SERIES/1 COBOL (EDX)5719-CB5 VERSION 2 LEVEL 0 (VALIDATION SUMMARY REPORT)
31 Aug. 1981 53 p
(PB82-155375; FCTC-81-101) Avail: NTIS HC A04/MF A01 CSCL 09B

A validation summary report (VSR) for the IBM Series/1 COBOL compiler (5719-CB5) Version 2 level 0 running under the Event Driven Executive Version 3 Level 1, providing a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1) is presented. The compiler was validated against the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the federal levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N82-34124# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
INTERNATIONAL BUSINESS MACHINES CORPORATION, IBM SERIES/1 HOST COBOL 5799 TEL, PRPQ P82647 VERSION 2 LEVEL 0 (COBOL TECHNICAL REPORT)
31 Aug. 1981 15 p
(PB82-155383; FCTC-81-33; FCTC-81-103) Avail: NTIS HC A02/MF A01 CSCL 09B

The Indexed I-O Level 1 and Sort-Merge Level 1 modules of the IBM Series/1 Host COBOL Compiler 5799 TEL PRPQ P82647 Version 2 Level 0 running under the OS/VS release 3.8 and Event Driven Executive (EDX) Version 3 Level 0 were evaluated. A consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Level 1 and Sort-Merge Level 1 modules of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1) showing all the discrepancies found, is presented. GRA

N82-34125# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
INTERNATIONAL BUSINESS MACHINES CORPORATION, IBM SERIES/1 HOST COBOL 5799 TEL, PRPQ P82647 VERSION 2 LEVEL 0 (VALIDATION SUMMARY REPORT)
31 Aug. 1981 53 p
(PB82-155391; FCTC-81-103) Avail: NTIS HC A04/MF A01 CSCL 09B

The IBM Series/1 Host COBOL compiler (5799 TEL PRPQ P82647) Version 2 Level 0 running under the OS/VS MVS Release 3.8 and the Event Driven Executive Version 3 Level 0 was validated against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The complier was validated against the low-intermediate level of X3.23-1974. The discrepancies found are listed. An overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed are presented. GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N82-34126# Los Alamos Scientific Lab., N. Mex.
SYSTEMS PERFORMANCE MEASUREMENT AND ANALYSIS
A. L. McKnight Feb. 1982 17 p
(Contract W-7405-eng-36)
(DE82-009067; LA-9257-MS) Avail: NTIS HC A02/MF A01

The initial work performed at the Los Alamos National Laboratory in computer performance analysis is described. Computer performance measurement and analysis as obtained from software monitoring is emphasized, however, hardware and operations monitoring are also discussed, and recommendations for future work in performance analysis are given. DOE

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N82-34127*# Massachusetts Inst. of Tech., Cambridge. Space Systems Lab.
SPACE APPLICATIONS OF AUTOMATION, ROBOTICS AND MACHINE INTELLIGENCE SYSTEMS (ARAMIS). VOLUME 1: EXECUTIVE SUMMARY Final Report
Rene H. Miller, Marvin L. Minsky, and David B. S. Smith Aug. 1982 46 p refs 4 Vol.
(Contract NAS8-34381)
(NASA-CR-162079; NAS 1.26:162079; SSL-21-82-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 09B

Potential applications of automation, robotics, and machine intelligence systems (ARAMIS) to space activities, and to their related ground support functions are explored. The specific tasks which will be required by future space projects are identified. ARAMIS options which are candidates for those space project tasks and the relative merits of these options are defined and evaluated. Promising applications of ARAMIS and specific areas for further research are identified. The ARAMIS options defined and researched by the study group span the range from fully human to fully machine, including a number of intermediate options (e.g., humans assisted by computers, and various levels of teleoperation). By including this spectrum, the study searches for the optimum mix of humans and machines for space project tasks. Author

N82-34128*# Massachusetts Inst. of Tech., Cambridge. Space Systems Lab.
SPACE APPLICATIONS OF AUTOMATION, ROBOTICS AND MACHINE INTELLIGENCE SYSTEMS (ARAMIS). VOLUME 3: ARAMIS OVERVIEW Final Report
Rene H. Miller, Marvin L. Minsky, and David B. S. Smith Aug. 1982 177 p refs 4 Vol.
(Contract NAS8-34381)
(NASA-CR-162081; NAS 1.26:162081; SSL-23-82-Vol-3) Avail: NTIS HC A09/MF A01 CSCL 09B

An overview of automation, robotics, and machine intelligence systems (ARAMIS) is provided. Man machine interfaces, classification, and capabilities are considered. N.W.

N82-34129*# Martin Marietta Aerospace, Denver, Colo.
EVALUATION OF AUTOMATED DECISIONMAKING METHODOLOGIES AND DEVELOPMENT OF AN INTEGRATED ROBOTIC SYSTEM SIMULATION. VOLUME 1: STUDY RESULTS Final Report
James W. Lowrie, Alfred J. Fermelia, Dennis C. Haley, Keith D. Gremban, Jeff VanBaalen, and Richard W. Walsh Sep. 1982 90 p refs 3 Vol.
(Contract NAS1-16759)
(NASA-CR-165975; NAS 1.26:165975; MCR-82-581-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 09B

A variety of artificial intelligence techniques which could be used with regard to NASA space applications and robotics were evaluated. The techniques studied were decision tree manipulators, problem solvers, rule based systems, logic programming languages, representation language languages, and expert systems. The

overall structure of a robotic simulation tool was defined and a framework for that tool developed. Nonlinear and linearized dynamics equations were formulated for n link manipulator configurations. A framework for the robotic simulation was established which uses validated manipulator component models connected according to a user defined configuration. Author

N82-34130*# Martin Marietta Aerospace, Denver, Colo.
EVALUATION OF AUTOMATED DECISIONMAKING METHODOLOGIES AND DEVELOPMENT OF AN INTEGRATED ROBOTIC SYSTEM SIMULATION, VOLUME 2, PART 1. APPENDIX A: SOFTWARE DOCUMENTATION Final Report
James W. Lowrie, Alfred J. Fermelia, Dennis C. Haley, Keith D. Gremban, Jeff VanBaalen, and Richard W. Walsh Sep. 1982 166 p refs 3 Vol.
(Contract NAS1-16759)
(NASA-CR-165976; NAS 1.26:165976;
MCR-82-581-Vol-2-Pt-1-App-A) Avail: NTIS HC A08/MF A01 CSCL 09B

Documentation of the preliminary software developed as a framework for a generalized integrated robotic system simulation is presented. The program structure is composed of three major functions controlled by a program executive. The three major functions are: system definition, analysis tools, and post processing. The system definition function handles user input of system parameters and definition of the manipulator configuration. The analysis tools function handles the computational requirements of the program. The post processing function allows for more detailed study of the results of analysis tool function executions. Also documented is the manipulator joint model software to be used as the basis of the manipulator simulation which will be part of the analysis tools capability. Author

N82-34131*# Martin Marietta Aerospace, Denver, Colo.
EVALUATION OF AUTOMATED DECISIONMAKING METHODOLOGIES AND DEVELOPMENT OF AN INTEGRATED ROBOTIC SYSTEM SIMULATION. VOLUME 2, PART 2: APPENDIXES B, C, D AND E Final Report
James W. Lowrie, Alfred J. Fermelia, Dennis C. Haley, Keith D. Gremban, Jeff VanBaalen, and Richard W. Walsh Sep. 1982 125 p refs 3 Vol.
(Contract NAS1-16759)
(NASA-CR-165977; NAS 1.26:165977;
MCR-82-581-Vol-2-Pt-2-App-B; MCR-82-581-Vol-2-Pt-2-App-C;
MCR-82-581-Vol-2-Pt-2-App-D; MCR-82-581-Vol-2-Pt-2-App-E)
Avail: NTIS HC A06/MF A01 CSCL 09B

The derivation of the equations is presented, the rate control algorithm described, and simulation methodologies summarized. A set of dynamics equations that can be used recursively to calculate forces and torques acting at the joints of an n link manipulator given the manipulator joint rates are derived. The equations are valid for any n link manipulator system with any kind of joints connected in any sequence. The equations of motion for the class of manipulators consisting of n rigid links interconnected by rotary joints are derived. A technique is outlined for reducing the system of equations to eliminate contraint torques. The linearized dynamics equations for an n link manipulator system are derived. The general n link linearized equations are then applied to a two link configuration. The coordinated rate control algorithm used to compute individual joint rates when given end effector rates is described. A short discussion of simulation methodologies is presented. J.D.

N82-34132# Naval Postgraduate School, Monterey, Calif. Dept. of Systems Technology.
APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN VOICE RECOGNITION SYSTEMS IN MICRO-COMPUTERS M.S. Thesis
Frank Sal Calcaterra Mar. 1982 94 p refs
(AD-A115735) Avail: NTIS HC A05/MF A01 CSCL 17/2

This research investigates the use of inexpensive voice recognition systems hosted by micro-computers. The specific intent was to demonstrate a measurable and statistically significant improvement in the performance of relatively unsophisticated voice recognizers through the application of artificial intelligence algorithms to the recognition software. Two different artificial intelligence algorithms were studied, each with differing levels of sophistications. Results showed that artificial intelligence can increase recognizer system reliability. The degree of improvement in correct recognition percentage varied with the amount of sophistication in the artificial intelligence algorithm. GRA

N82-34133# Brown Univ., Providence, R. I. Center for Dynamical Systems.
PRACTICAL METHODS FOR THE COMPENSATION AND CONTROL OF MULTIVARIABLE SYSTEMS Final Report, 1 Jan. 1977 - 31 Dec. 1981
William A. Wolovich and Peter L. Falb Apr. 1982 28 p refs
(Grant AF-AFOSR-3182-77; AF Proj. 2304)
(AD-A117728; AFOSR-82-0583TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

The primary objective of this research has been the development of practical methods for the compensation and control of multivariable systems in order to facilitate the design of controllers for complex Air Force systems. A variety of different approaches were employed to accomplish this objective. In particular, the authors were most successful in developing new parameter adaptive control schemes for linear multivariable systems. One of the design algorithms employs an adaptive Luenberger observer which automatically adjusts the poles of a given system. It is felt that such an adaptive controller could be used in a variety of aerospace applications. GRA

N82-34134# Argonne National Lab., Ill.
NEWTON'S METHOD
J. J. More and D. C. Sorensen Feb. 1982 44 p refs
(Contract W-31-109-eng-38)
(DE82-013692; ANL-82-8) Avail: NTIS HC A03/MF A01

Two main approaches to Newton's method for unconstrained minimization, the line search approach and the trust region approach, are examined along with some of the developments in the optimization field which are related to Newton's method. In particular, several variations on Newton's method which are appropriate for large scale problems are explored and it is shown how quasi-Newton methods can be derived quite naturally from Newton's method. DOE

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-34135# RAND Corp., Santa Monica, Calif.
PALM'S THEOREM FOR NONSTATIONARY PROCESSES
Gordon B. Crawford Oct. 1981 43 p refs
(AD-A117089; RAND/R-2750-RC) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report provides both an introduction for the layman and a statement and technical proof of the dynamic form of Palm's Theorem. It is intended to help the layman develop a feeling for what is, and what is not, an appropriate application. A general statement of the theorem is given along with less general forms that are easy to use and exact in many applications. Section 2 explains the importance of the theorem to stock calculations and presents an intuitive proof of the classical form of Palm's Theorem for steady-state arrivals and discrete time. Section 3 gives several different steady-state examples to provide an understanding of what is, and what is not, a Poisson arrival process and when the dynamic form of Palm's Theorem applies. Several different statements of Palm's Theorem are developed in Section 4 to facilitate its application. These forms are used to prove what has been known as the worst-case approximation theorem. Section 4 ends with a discussion of the application of the dynamic form to the calculation of war readiness spares requirements for aircraft. GRA

N82-34136# Georgia Inst. of Tech., Atlanta. Center for Production and Distribution Research.
AN O(NLOGN) PLANAR TRAVELLING SALESMAN HEURISTIC BASED ON SPACEFILLING CURVES
L. K. Platzman and J. J. Bartholdi, III Apr. 1982 15 p refs Submitted for publication
(Contract N00014-80-K-0709; NR Proj. 041-565)
(AD-A115357; PDRC-82-07) Avail: NTIS HC A02/MF A01 CSCL 12/1

N points in a square of area A may be sorted according to their images under a spacefilling mapping to give a tour of length at most 2 square root of (NA). If the points are statistically independent under a smooth distribution, with N large, then the tour will be roughly 25% longer than optimum (and a simple enhancement reduces this to 15%). The algorithm is easily coded: a complete BASIC program is included in the appendix. Since the algorithm consists essentially of sorting, points are easily added or removed. Our method may also be used with simple dynamic programming to solve TSP path problems. GRA

N82-34137# Naval Postgraduate School, Monterey, Calif. Dept. of Mathematics.
THE STRENGTH OF SURROGATE CONSTRAINTS FOR THE LINEAR ZERO-ONE INTEGER PROGRAMMING PROBLEM
Frank R. Giordano Feb. 1982 24 p refs
(AD-A115736; NPS55-82-008) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this report the author discusses the strength of surrogate constraints in general and presents a heuristic procedure for iteratively constructing stronger surrogates beginning with the dual multiplier surrogate. GRA

N82-34138# Naval Postgraduate School, Monterey, Calif.
EXTENSIONS OF SOME MODELS FOR POSITIVE-VALUED TIME SERIES Ph.D. Thesis
David Kennedy Hugus Mar. 1982 358 p refs
(AD-A115754) Avail: NTIS HC A16/MF A01 CSCL 12/1

Time series models with autoregressive, moving average and mixed autoregressive-moving average correlation structure and with positive-valued non-normal marginal distribution are considered. First, a flexible mixed model GLARMA(p,q) with Gamma marginals is investigated. The correlation structure for several special cases is derived. For the first-order autoregressive case, GLAR(1), the conditional density of X sub n given X sub n-1 is derived. This leads to the formation of a likelihood function and a numerical approximation to and a simulation study of the maximum likelihood method of parameter estimation. Multivariate extensions of the model are considered briefly. Second, three methods for generating first-order moving average sequences with Exponential marginals are examined. These generalize the EMA (1) Exponential model. Negative correlation using antithetic variables is investigated in the moving average models. A preliminary analysis of wind speed data obtained over a 15-year period in the Gulf of Alaska is presented. A model with four harmonic deterministic mean multiplying random innovative factors modeled by a GLAR (1) process is developed. Correlograms and periodograms are used to determine the model for the mean and the structure of the innovation process. Author (GRA)

N82-34139# Naval Postgraduate School, Monterey, Calif. Dept. of Electrical Engineering.
EFFICIENT MULTICHANNEL AUTOREGRESSIVE MODELING IN TIME AND FREQUENCY DOMAIN Ph.D. Thesis
David J. Klich Mar. 1982 180 p refs
(AD-A115752) Avail: NTIS HC A09/MF A01 CSCL 12/1

The single channel autoregressive lattice has been successfully applied to problems including speech analysis and recognition, spectral analysis and noise cancelling. More recently the two channel autoregressive (AR) lattice has been exploited for autoregressive moving average (ARMA) analysis of systems for modeling and identification. This dissertation considers the multichannel AR lattice when applied to ARMA systems analysis. Constraints on lattice parameters, based on the input output relations of the system under test, are developed. The lattice is redefined in terms of the frequency domain representation of the input data. This proves to be useful because it allows the input to be normalized so that the lattice yields a consistant set of parameters independent of the test source characteristics. Lastly the lattice is redefined in terms of correlations of the input signals. This results in a computationally and storage efficient lattice algorithm. Author (GRA)

N82-34140# North Carolina Univ., Chapel Hill. Inst. of Statistics.
OPTIMIZATION ALGORITHMS ON RANDOM GRAPHS
D. G. Kelly and D. J. A. Welsh Apr. 1982 13 p refs
(Contract N00014-76-C-0550)
(AD-A115804; MIMEO-SER-1389) Avail: NTIS HC A02/MF A01 CSCL 12/1

We consider random graphs on vertices 0,1,2,...,n in which each edge, independent of the others, is present with probability p and absent with probability q=1-p. On such a graph we consider two different random walks starting with vertex n, moving at each step from a vertex to a lower-numbered neighbor, and stopping when they reach either vertex 0 or a sink, a vertex with no lower-numbered neighbor. These walks are simplified attempts to reproduce probabilistically the behavior of the simplex algorithm on linear programs. We derive some simple asymptotic results on the distribution of the number of sinks in a random graph, and also on the distributions of the numbers of steps needed by each of the two random walks. GRA

N82-34141# Rensselaer Polytechnic Inst., Troy, N. Y.
ASYMPTOTIC AND NUMERICAL METHODS FOR VECTOR SYSTEMS OF SINGULARLY-PERTURBED BOUNDARY VALUE PROBLEMS
Joseph E. Flaherty and Robert E. OMalley, Jr. Apr. 1982 15 p refs Prepared in cooperation with Army Armament Research and Development Command, Watervliet, N.Y.
(Grant AF-AFOSR-0192-80; AF Proj. 2304)
(AD-A117111; AFOSR-82-0556TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Procedures are developed for constructing asymptotic solutions for certain nonlinear singularly-perturbed vector two-point boundary value, problems having boundary layers at one or both end points. The asymptotic approximations are generated numerically and can either be used as is or to furnish a two-point boundary value code (e.g., COLSYS) with an initial approximation and a nonuniform computational mesh. The procedures are applied to several examples involving the deformation of nonlinear elastic beams. Author (GRA)

N82-34142# Science Applications, Inc., Pleasanton, Calif.
MOVING FINITE ELEMENTS IN 2-D Annual Report, 8 Dec. 1981 - 7 Jun. 1982
Robert J. Gelinas 7 Jun. 1982 40 p refs
(Contract F49620-81-C-0073; AF Proj. 2304)
(AD-A117078; SAI/PL/MFE-2D-1-82; AFOSR-82-0576TR; AR-1)
Avail: NTIS HC A03/MF A01 CSCL 12/1

The moving finite element (MFE) method is a new PDE solution method which has shown significant promise in 1-D for the numerical solution of some of the most difficult problems under study with extremely large, but finite, gradients. The overall the present research is to explore further the promise of the continous mode moving properties of the MFE method in 2-D. For this, both the logical structure of the MFE method and its reduction to practice in 2-D are under investigation of this project. In this first year's effort, results of several test examples involving conservation equations have shown the MFE method to be a robust PDE solver in 2-D. Burger-like equations which generate non-uniform, skewed waveforms with extremely large gradients in 2-D have been solved stably and accurately on an 8 x 8 grid of moving nodes. Examples of scalar waves propagating on closed, circular paths have been solved with similar levels of effectiveness on a 6 x 6 MFE grid mesh. The node behavior in all examples tested to date has been extremely flexible and easily controlled with no grid tangling

or biasing effects. The MFE code architecture in 2-D is found to be amenable to vector and parallel processing computational methods and advanced computers. Author (GRA)

N82-34143# University of Southern Illinois, Carbondale.
PREPROCESSING TECHNIQUES IN TRANSIENT ANALYSIS Final Technical Report
David W. Kammler Griffiss AFB, N.Y. RADC Apr. 1982 80 p refs
(Contract F30602-78-C-0148)
(AD-A116360; RADC-TR-82-72) Avail: NTIS HC A05/MF A01 CSCL 12/1

In the Prony algorithm one determines pole locations from uniformly spaced wave form samples. In practice those samples are noisy which limits the effectiveness of the algorithm. This report first subjects the data samples to a pole invarient linear transformation to reduce the signal to noise ratio. The particular linear transformation chosen is based upon apriori knowledge of the regions where the poles are located. Author (GRA)

N82-34144# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
THE G-SPECTRAL ESTIMATOR
M. J. Morton and H. L. Gray May 1982 45 p refs
(Contract N00014-75-C-0439; NR Proj. 042-280)
(AD-A116942; TR-159) Avail: NTIS HC A03/MF A01 CSCL 12/1

A spectral estimator referred to as the G-spectral estimator was introduced by Gray and Foster. It was then studied by Gray, Houston and Morgan. The estimator was then based upon an approximate Gn-transform of the sample autocorrelation function and is equivalent to an en-transform of the same function. This paper gives a modified definition of the G-spectral estimator which will be seen to avoid the difficulties noted by Gray, Houston and Morgan, and will be shown to be equivalent to a method of moments ARMA spectral estimator. GRA

N82-34145# Data Information Associates, Albuquerque, N. Mex.
A TOEPLITZ GRAM-SCHMIDT ALGORITHM FOR AUTOREGRESSIVE MODELING
Herbert T. Davis, H. Joseph Newton (Texas A&M Univ., College Station), and Marcello Pagano (Harvard Univ., Cambridge, Mass.) College Station, Tex. Texas A&M Univ. Jul. 1982 22 p refs
(Contracts N00014-82-MP-2001; DAAG29-80-C-0070)
(AD-A117071; TR-N-33) Avail: NTIS HC A02/MF A01 CSCL 12/1

An algorithm is presented for efficiently finding the information needed in the modified Gram-Schmidt decomposition of the augmented autoregressive design matrix to find the Yule-Walker estimators of autoregressive parameters for orders 1, 2, ..., M. the algorithm is shown to be slightly slower than Levinson's algorithm and to require slightly more storage but enjoys the superior numerical properties of the modified Gram-Schmidt decomposition algorithm. Further, it is shown how the algorithm provides a unified framework for suggesting robust autoregressive estimators, for finding autoregression diagnostics, and for understanding the Burg algorithm. Author (GRA)

N82-34146# Texas A&M Univ., College Station. Inst. of Statistics.
TIME SERIES MODEL IDENTIFICATION, SPECTRAL ESTIMATION AND FUNCTIONAL INFERENCE
Emanuel Parzen Jun. 1982 36 p refs
(Contracts N00014-82-MP-2001; DAAG29-80-C-0070)
(AD-A117073; TR-N-31) Avail: NTIS HC A03/MF A01 CSCL 12/1

This survey talk seeks to emphasize the following ideas: Functional inference formulation of parameter estimation; Parameter estimation and information theory; Information divergence of spectral density functions; Model identification, prediction theory, and memory; ARMA model identification for short memory time series; Model identification of long memory time series; the array of spectral estimators; and Quantile approach to non-Gaussian time series analysis. GRA

N82-34147# Naval Research Lab., Washington, D. C. Fluid Dynamics Branch.
VARIATIONAL ANALYSIS AND APPROXIMATE SOLUTIONS FOR TRANSPORT PHENOMENA Interim Report
George A. Keramidas 30 Jun. 1982 83 p refs
(RR0230141)
(AD-A117110; NRL-MR-4852) Avail: NTIS HC A05/MF A01 CSCL 12/1

Certain concepts of classical mechanics are utilized to derive the variational formulation for a field partial differential equation. By introducing suitable parameters, it is demonstrated that the concepts of virtual work and generalized coordinates can be extended to the general transport equation and this equation can be translated into Lagrange's equations of mechanics. The system of equations may represent a large number of physical processes and it is not restricted by any means to a particular problem. The Lagrangian system of equations is most suitable for deriving approximate solutions and this is demonstrated by assuming a linear series expansion in terms of the generalized coordinates. Furthermore, it is shown that approximate methods, such as the finite element method, can be directly derived as a special application of the generalized approach. Examples of approximate solutions are given for some typical problems encountered in transport processes. Author (GRA)

N82-34148# Ballistic Research Labs., Aberdeen Proving Ground, Md.
A SIMPLE QUADRATURE FORMULA FROM SIMPSON'S RULE APPLICABLE FOR ODD OR EVEN n Final Report
Noel H. Ethridge Jun. 1982 16 p
(DA Proj. 1L1-61102-AH-43)
(AD-A116867; AD-F300051; ARBRL-MR-03183) Avail: NTIS HC A02/MF A01 CSCL 12/1

A simple quadrature formula is derived using Simpson's One-Third Rule that applies for an odd or even number of subdivisions, and whose coefficients of the ordinates are unity except near the ends of the integration range. To apply the formula, two additional ordinates must be available, those at the midpoint of the intervals at each end of the integration range. GRA

N82-34149# Iowa State Univ. of Science and Technology, Ames. Dept. of Mathematics.
ALGEBRAIC TESTS FOR FUNCTIONAL CONTROLLABILITY OF FUNCTIONAL DIFFERENTIAL EQUATION SYSTEMS Final Scientific Report, 22 Dec. 1979 - 31 Dec. 1981
R. Triggiani May 1982 6 p refs
(Grant AF-AFOSR-3338-77; AF Proj. 2304)
(AD-A117032; AFOSR-82-0534TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The first phase of work supported under the grant focused primarily on function space controllability properties, of interest in tracking problems, and in stabilizability properties, with arbitrarily preassigned exponential decay, for linear retarded control systems having delays in their dynamics. The second phase of work ample ground and evidence was provided that delay differential equations of retarded and neutral types on the one hand and distributed parameter systems of parabolic and hyperbolic types on the other hand are, somewhat surprisingly, closely related. It was pointed out that it is particularly within the context of semigroup theory that this link is brought up to light. Thus, it was asserted, the semigroup theory appeared to be capable of providing an altogether unexpected unifying approach to all these classes of apparently diverse dynamical systems. It was therefore natural to enlarge the original investigation as to include boundary control systems. Publications arising from this work are listed in the report.
Author (GRA)

N82-34150# Lincoln Lab., Mass. Inst. of Tech., Lexington.
A FUNCTIONAL MODEL FOR THE CLOSELY SPACED OBJECT RESOLUTION PROCESS

C. B. Chang and K. P. Dunn 20 May 1982 41 p refs
(Contract F19628-80-C-0002)
(AD-A116890; TR-611; ESD-TR-82-046) Avail: NTIS HC A03/MF A01 CSCL 12/1

In this report, we describe a statistical model for characterizing the closely spaced object (CSO) resolution process. A logic for CSO clustering which simulates the CSO detection process is given. Measurement standard deviations for isolated targets, resolved CSO's, and unresolved CSO's are given. Results of this report are useful for functional simulation and performance analysis for the CSO resolution problem. Author (GRA)

N82-34151# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
DISTRIBUTED MINIMUM HOP ALGORITHMS
Robert G. Gallager Jan. 1982 36 p refs
(Contract N00014-75-C-1183; ARPA Order 3045)
(AD-A117808; LIDS-P-1175) Avail: NTIS HC A03/MF A01 CSCL 12/1

The control of data communication networks (and any other large distributed systems) must be at least partly distributed because of the need to make observations and exert control at the various nodes of the network. When one also considers the desireability of letting networks grow (or shrink due to failures), it is reasonable to consider control algorithms with minimal or no centralized operations. In developing distributed algorithms for such control functions as routing and flow control, for example, it becomes evident that there are a number of simple network problems which arise repeatedly; distributed algorithms for solving these simple problems are then useful as building blocks in more complex algorithms. Mathematically we model the network as a connected undirected graph with, say, n nodes and e edges. Each node contains the facilities for doing computations, storing data, and sending and receiving messages over the adjoining edges. Messages are assumed to be transmitted without error but with an unknown variable finite delay. Successive messages in a given direction on a given edge are queued for transmission at the sending node, are transmitted, arrive in the order transmitted and are queued waiting for processing by the receiving node.GRA

N82-34152# Brown Univ., Providence, R. I. Center for Dynamical Systems.
PERTURBATION OF HOMOCLINICS AND SUBHARMONICS IN DUFFING'S EQUATION
Jack K. Hale and Adalberto Spezamiglio (Inst. de Ciencias Matematicas de Sao Carlos, Brazil) Mar. 1982 30 p refs
(Contract DAAG29-79-C-0161; Grants AF-AFOSR-0198-81; NSF MCS-79-05774; AF Proj. 2304)
(AD-A117390; LCDS-82-3; AFOSR-82-0558TR) Avail: NTIS HC A03/MF A01 CSCL 21/1

For (lambda, mu) and (g,f) small, the equation x - x + 2x cubed + g(x) = - lambda x + mu(cos t + f(t))is considered near the separatrix S of the unperturbed equation (lambda, mu) = (0,0). For (g,f) in a neighborhood of the zero functions, a complete description is given of the bifurcation curves in (lambda, mu) - space to homoclinic points. The perturbation of subharmonics outside S is also considered in a symmetric and nonsymmetric case. GRA

N82-34153# Texas A&M Univ., College Station. Inst. of Statistics.
QUANTILES, PARAMETRIC-SELECT DENSITY ESTIMATIONS, AND BI-INFORMATION PARAMETER ESTIMATORS
Emanuel Parzen Jun. 1982 25 p refs
(Contract DAAG29-80-C-0070)
(AD-A117460; TR-B-6; ARO-16992.12-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper outlines a quantile-based approach to functional inference problems in which the parameters to be estimated are density functions. Exponential models and autoregressive models are approximating densities which can be justified as maximum entropy for respectively the entropy of a probability density and the entropy of a quantile density. It is proposed that bi-information estimation of a density function can be developed by analogy to the problem of identification of regression models. Author (GRA)

N82-34154# Duke Univ., Durham, N. C. Dept. of Computer Science.
PERFORMANCE BOUNDS FOR BINARY TESTING WITH ARBITRARY WEIGHTS
Donald W. Loveland Mar. 1982 43 p refs Submitted for publication
(Grant AF-AFOSR-0221-81; AF Proj. 2304)
(AD-A117493; CS-1982-4; AFOSR-82-0557TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

Binary testing concerns finding good algorithms to solve the class of binary identification problems. A binary identification problem has as input a set of objects, including one marked as distinguished (e.g., faulty), for each object an a priori estimate that it is the distinguished object, and a set of tests. Output is a testing procedure to isolate the distinguished object. One seeks minimal cost testing procedures where cost is the average cost of isolation, summed over all objects. This is a problem schema for the diagnosis problem: applications occur in medicine, systematic biology, machine fault location, quality control and elsewhere. In this paper we extend work of Garey and Graham to assess the capability of fast approximation rule, the binary splitting rule, to give near optimal testing procedures when the a priori estimates are arbitrary. We find conditions on the test set such that approximation error reduces nearly to, that of the equally likely a priori estimate case of Garey and Graham and find another upper bound on approximation error for the same test set condition which works very well under a priori estimate assumptions where the first results is poor. Author (GRA)

N82-34155# Florida State Univ., Tallahassee. Dept. of Statistics.
CENTRAL LIMIT THEOREMS IN THE AREA OF LARGE DEVIATIONS FOR SOME DEPENDENT RANDOM VARIABLES
Narasinga Rao Chaganty and J. Sethuraman Jul. 1982 27 p refs
(Contract DAAG29-79-C-0158)
(AD-A117714; FSU-Statistics-M634; TR-D-54-ARO; ARO-16713.20-MA) Avail: NTIS HC A03/MF A01 CSCL 12/1

In this paper we obtain central limit theorems for some dependent random variables which are used to describe the distribution of magnetic spins present in a ferromagnet crystal. A ferromagnet crystal consists of a large number of sites. At site i there is some amount of magnetic spin present. The magnetic spin present at any site interacts with the magnetic spins at its neighboring sites and hence gives rise to some dependency among the magnetic spin present. GRA

N82-34156# Naval Underwater Systems Center, New London, Conn. Surface Ship Sonar Dept.
IFD: AN IMPLICIT FINITE-DIFFERENCE COMPUTER MODEL FOR SOLVING THE PARABOLIC EQUATION
Ding Lee and George Botseas 27 May 1982 104 p refs
(AD-A117701; NUSC-TR-6659) Avail: NTIS HC A06/MF A01 CSCL 20/1

A general purpose computer model, based on the implementation of an implicit finite-difference scheme, is developed for the solution of the parabolic wave equation. This model can be used to predict acoustic propagation loss in both range-independent and range-dependent environments. An important feature of the model is that it can handle arbitrary surface boundary conditions and an irregular bottom with arbitrary bottom boundary conditions. In the event that the bottom boundary conditions cannot be expressed mathematically, the model has the capability of introducing an artificial absorbing bottom such that, with the appropriate bottom attenuation, the problem becomes solvable. Another important feature of the model is that it can handle horizontal interfaces of layered media. The model is easy to use and easy to modify. Numerical test examples are included to demonstrate the capabilities of the model. Author (GRA)

N82-34157# Los Alamos Scientific Lab., N. Mex.
ACCURATE MONOTONICITY-PRESERVING CUBIC INTERPOLATION
J. M. Hyman Feb. 1982 22 p refs
(Contract W-7405-eng-36)
(DE82-009964; LA-8796-MS) Avail: NTIS HC A02/MF A01

A simple and effective algorithm to construct a monotonicity-preserving cubic Hermite interpolant for data with rapid variations is presented. Constraining the derivatives of the interpolant according to geometric considerations makes the interpolant consistent with local monotonicity properties of the data. Numerical examples are given that compare the quality and accuracy of the proposed interpolation method with other standard interpolants. DOE

N82-34158# Cambridge Univ. (England). Dept. of Engineering.
FINITE DIFFERENCE APPROXIMATIONS AND STABILITY OF DISTRIBUTED PARAMETER SYSTEMS
J. K. Mountain 1980 50 p refs
(PB82-177635; CUED/F-CAMS/TR-204-1980; ISSN-0309-765X)
Avail: NTIS HC A03/MF A01 CSCL 12A

Following a discussion of initial value problems in Banach spaces, finite difference approximations in the Banach space are introduced, and the Lax Equivalence Theorem is presented. For a well-posed problem, stability of the origin is discussed from a control standpoint, and two theorems relating stability/instability of the origin to properties of finite difference approximations to the problem are proved. Author (GRA)

N82-34159# Cambridge Univ. (England). Dept. of Engineering.
STRUCTURE AND SMITH-MACMILLAN FORM OF A RATIONAL MATRIX AT INFINITY
A. I. G. Vardulakis, D. N. J. Limebeer, and N. Karcanias (City Univ., London) 1981 40 p refs
(PB82-178625; CUED/F-CAMS/TR-218-1981; ISSN-0309-765X)
Avail: NTIS HC A03/MF A01 CSCL 12A

The use of special row and column operations in the reduction of a rational matrix to its Smith-MacMillan form at infinity is investigated. The connections between this reduction procedure and the valuation approach are established. A graphical method for finding the Smith-MacMillan form of a rational matrix at infinity from its Bode magnitude array, and some new results on realization theory for polynomial matrices, are presented. Author (GRA)

N82-34160# Cambridge Univ. (England). Dept. of Engineering.
JAMES CLERK MAXWELL'S CAMBRIDGE MANUSCRIPTS: EXTRACTS RELATING TO CONTROL AND STABILITY, PART 1
A. T. Fuller Aug. 1981 48 p refs
(PB82-180571; CUED/F-CAMS/TR-217-1981-Pt-1;
ISSN-0309-765X) Avail: NTIS HC A03/MF A01 CSCL 12A

Maxwell's manuscripts held at Cambridge University Library contain several items of interest from a control or stability point of view. Extracts are reproduced dealing with (1) a speed governor designed by Maxwell at the age of fifteen, and (2) the stability of fluid motion (1855). Author (GRA)

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-34161# Florida State Univ., Tallahassee. Dept. of Statistics.
RANKING AND SUBSET SELECTION PROCEDURES FOR EXPONENTIAL POPULATIONS WITH TYPE-1 AND TYPE-2 CENSORED DATA
Roger L. Berger and Jee Soo Kim May 1982 31 p refs
(Contract DAAG29-79-C-0158)
(AD-A115821; FSU-Statistics-M628; TR-D52-ARO;
ARO-16713.18-MA) Avail: NTIS HC A03/MF A01 CSCL 12/1

In this paper ranking and subset selection procedures for exponential populations with respect to the largest location and scale parameters are proposed. The data are assumed to be generated from Type-I and Type-II censoring mechanisms. The selection procedure proposed for the largest scale parameter based on Type-II censored data is equivalent to Gupta's procedure for gamma populations. Two procedures proposed for the selection of the largest location parameter under Type-I censoring and Type-II censoring are asymptotically equivalent. GRA

N82-34162# Pittsburgh Univ., Dept. of Mathematics and Statistics.
COMPARING COHERENT SYSTEMS
Henry W. Block and Wagner deSouza Borges May 1982 16 p refs Sponsored in part by Conselho Nacional de Desenvolvimento e Tecnologico
(Contract N00014-76-C-0839)
(AD-A116813; Rept-82-09) Avail: NTIS HC A02/MF A01 CSCL 12/1

It is a well known engineering principle that 'redundancy at the component level is more effective than redundancy at the system level.' Here, redundancy simply means components are connected in parallel and the principle results from comparing the systems obtained when this parallel protocol is applied both at the component and system levels. It is shown in this paper that if parallel or series protocols are ruled out, corresponding versions of the above principle are not possible. This question is examined both in structural as well as in reliability (stochastic) terms. Author (GRA)

N82-34163# Pittsburgh Univ., Dept. of Mathematics and Statistics.
INEQUALITIES ON DISTRIBUTIONS: BIVARIATE AND MULTIVARIATE
Henry W. Block and Allan R. Sampson May 1982 21 p refs
(Contracts N00014-76-C-0839; F49629-82-K-001)
(AD-A116814; Rept-72-11) Avail: NTIS HC A02/MF A01 CSCL 12/1

Inequalities concerning bivariate and multivariate distributions in statistics are surveyed, as well as historical background. Subjects treated include inequalities arising through positive and negative dependence; Boole, Bonferroni, and Frechet inequalities; convex symmetric set inequalities; stochastic ordering; stochastic majorization and inequalities obtained by majorization; Chebyshev and Kolmogorov-type inequalities; multivariate moment inequalities; and applications to simultaneous inference, unbiased testing and reliability theory. Author (GRA)

N82-34164# Pittsburgh Univ., Inst. for Statistics and Applications.
A CONCEPT OF NEGATIVE DEPENDENCE USING STOCHASTIC ORDERING
Henry W. Block, Thomas H. Savits, and Moshe Shaked (Arizona Univ., Tucson) Nov. 1981 19 p refs
(Contract N00014-76-C-0839; Grant NSF MCS-79-27150)
(AD-A116888; TR-81-34) Avail: NTIS HC A02/MF A01 CSCL 12/1

A concept of negative dependence called negative dependence by stochastic ordering is introduced. This concept satisfies various closure properties. It is shown that three models for negative dependence satisfy it and that it implies the basic negative orthant inequalities. This concept is also satisfied by the multinomial, multivariate hypergeometric, Dirichlet and Dirichlet compound multinomial distributions. Furthermore, the joint distribution of ranks of a sample and the multivariate normal with nonpositive pairwise correlations also satisfy this condition. The positive dependence analog of this condition is also studied. Author (GRA)

N82-34165# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
EDGEWORTH EXPANSIONS IN STATISTICS: A BRIEF REVIEW
Shanti S. Gupta and S. Panchapakesan Jun. 1982 30 p refs Prepared in cooperation with University of Southern Illinois, Carbondale

(Contract N00014-75-C-0455)
(AD-A117061; TR-82-18) Avail: NTIS HC A03/MF A01 CSCL 12/1

Asymptotic expansions for distribution functions are of great importance in statistical inference. The basic aspects and some recent developments regarding Edgeworth expansions and Cornish-Fisher expansions are discussed. In recent years, substantial progress has been made in obtaining Berry-Esseen bounds and Edgeworth expansions for test statistics such as linear rank statistics, U-statistics, linear (trimmed and untrimmed) combinations of order statistics. An account of these results is given in Section 4 followed by expansions for minimum contrast estimators and Fisher-consistent estimators. GRA

N82-34166# Rochester Univ., N. Y. Dept. of Statistics.
PROBLEMS IN MULTIVARIATE ANALYSIS AND NONPARAMETRIC STATISTICS: APPLICATIONS OF THE THEORY OF COMBINING TESTS Final Scientific Report, 1 Jun. 1977 - 30 Sep. 1981
Govind S. Mudholkar Apr. 1982 8 p
(Grant AF-AFOSR-3360-77; AF Proj. 2304)
(AD-A117092; AFOSR-82-0531TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The problems investigated with the support of this grant, somewhat broad in nature, were under two major headings with a number of subheadings in each, as follows: (1) Multivariate Analysis, (a) stepwise procedures, (b) approximations to multivariate distributions, (c) classification, (d) covariance structure problems; (2) Nonparametric Methods, (a) goodness-of-fit problem, (b) two-sample problem, and (c) multivariate methods. A total of 28 technical reports were prepared and submitted. GRA

N82-34167# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
ROBUST REGRESSION PROCEDURES FOR PREDICTOR VARIABLE OUTLIERS
Dovalee Dorsett and Richard F. Gunst Mar. 1982 47 p refs
(Contract N00014-82-K-0207)
(AD-A117022; TR-157) Avail: NTIS HC A03/MF A01 CSCL 12/1

Least squares estimators of regression coefficients can be overly sensitive to violations of certain error assumptions; e.g., outliers in the response variable. One solution to the presence of outliers in a data base is to apply univariate robust estimation procedures to the residuals of estimated models. Equally problematic as outliers among the response variable are outliers or aberrant values for the predictor variables. Extreme values on individual predictor variables or an unusual combination of predictor variable values for a few observational units can distort least squares estimators even if the error assumptions are valid. This article discusses robust regression procedures, with special emphasis on techniques which are resistant to extreme predictor variable values. Author (GRA)

N82-34168# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
OPTIMAL GROUPING, SPACING, STRATIFICATION AND PIECEWISE CONSTANT APPROXIMATION
R. L. Eubank Jun. 1982 29 p refs
(Contract N00014-82-K-0207)
(AD-A117023; TR-164) Avail: NTIS HC A03/MF A01 CSCL 12/1

A variety of statistical problems of optimal grouping, spacing and stratification are seen to be best L sub 2 (0,1) free knot piecewise constant approximation problems. This allows for the development of conditions that insure the existence and uniqueness of solutions, a computational algorithm and simple approximate solutions. In addition this approach is seen to provide insight into the relationships between the various problems considered. Author (GRA)

N82-34169# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
RELATED CORRELATION COEFFICIENTS
J. E. Boyer, Jr., A. D. Palachek, and W. R. Schucany Mar. 1982 20 p refs
(Contract N00014-82-K-0207; NR Proj. 042-479)
(AD-A117231; TR-158) Avail: NTIS HC A02/MF A01 CSCL 12/1

Tests for comparing the strength of association between a variable X sub 1 and each of two potential predictor variables X sub 2 and X sub 3 are proposed and examined in a simulation study. The variances of X sub 2 and X sub 3 and the correlation between X sub 2 and X sub 3 are nuisance parameters. A simple modification of a test proposed by Williams (1959) is found to have good properties for a wide range of parameter values and both normal and nonnormal distributions. Author (GRA)

N82-34170# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
ON THE CORRELATION OF A GROUP OF RANKINGS WITH AN EXTERNAL ORDERING RELATIVE TO THE INTERNAL CONCORDANCE
Albert D. Palachek (Cincinnati Univ.) and William R. Schucany May 1982 13 p refs
(Contract N00014-82-K-0207; NR Proj. 042-479)
(AD-A117232; TR-161) Avail: NTIS HC A02/MF A01 CSCL 12/1

A method is presented for comparing the strength of agreement of a group of rankings with an external ordering to the corresponding measure of concordance within the group. While the procedure is not model dependent, we illustrate the characteristics of interest using an existing model for a non-null distribution for a population of rankings. U-statistics and a jackknife with adjusted degrees of freedom are employed to set approximate confidence intervals on the contrast between the two measures of rank order agreement. Author (GRA)

N82-34171# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
METHOD OF MOMENTS ESTIMATORS FOR THE MOVING AVERAGE COEFFICIENTS IN AN ARMA (p,q) PROCESS
M. J. Morton and H. L. Gray May 1982 17 p refs
(Contract N00014-75-C-0439; NR Proj. 042-280)
(AD-A116943; TR-160) Avail: NTIS HC A02/MF A01 CSCL 12/1

The standard procedure for computing the moving average method of moments parameter estimates for an ARMA process involves the numerical solution of a system of non-linear equations. In this paper it will be shown how the so-called inverse autocorrelations introduced by Cleveland can be utilized to compute the moving average parameter estimates as the solution to a system of linear equations, and that the method is faster and more accurate than solving the non-linear equations alluded to above. In addition, the procedure described below ensures that an invertible solution is obtained. Author (GRA)

N82-34172# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
A QUANTILE DOMAIN PERSPECTIVE ON THE RELATIONSHIPS BETWEEN OPTIMAL GROUPING, SPACING AND STRATIFICATION PROBLEMS
R. L. Eubank Jun. 1982 15 p refs
(Contract N00014-82-K-0207; NR Proj. 042-479)
(AD-A116944; TR-163) Avail: NTIS HC A02/MF A01 CSCL 12/1

The relationships between two distributions having the same solutions for problems of optimal spacing selection for the asymptotically best linear unbiased estimator of a location or scale parameter or for problems of optimal stratification for estimation of a population mean are investigated. Easily checked necessary and sufficient conditions under which two distributions have identical solutions to these problems are given in terms of their quantile and density-quantile functions. As an application of these results a quantile domain analog of a theorem due to Adatia and

Chan on the equivalence of optimal grouping, spacing and stratification problems is obtained. Author (GRA)

N82-34173# Texas A&M Univ., College Station. Inst. of Statistics.
AUTOREGRESSIVE SPECTRAL ESTIMATION AND FUNCTIONAL INFERENCE
Emanuel Parzen Jun. 1982 15 p refs
(Contract DAAG29-80-C-0070)
(AD-A117113; TR-N-29) Avail: NTIS HC A02/MF A01 CSCL 12/1

Functions used to describe the probability distributions of time series (both Gaussian and non-Gaussian) are introduced. The concept of type of a time series is defined. Autoregressive spectral densities are defined. Order determining criteria are motivated through the concept of model identification by estimating information. An approach to empirical spectral analysis is suggested. Author (GRA)

N82-34174# Texas A&M Univ., College Station. Inst. of Statistics.
AUTOREGRESSIVE SPECTRAL ESTIMATION
Emanuel Parzen Jun. 1982 50 p refs
(Contract DAAG29-80-C-0070)
(AD-A117266; TR-N-28) Avail: NTIS HC A03/MF A01 CSCL 12/1

Autoregressive spectral estimation is one of the new techniques for spectral analysis developed in the last two decades. Its theory and applications are extremely extensive. This article aims to provide an overview (rather than a detailed account) of the main ideas. A comprehensive bibliography guides the reader to articles in which case studies and comparisons of autoregressive spectral estimators are described. Author (GRA)

N82-34175# Texas A&M Univ., College Station. Inst. of Statistics.
MAXIMUM ENTROPY INTERPRETATION OF AUTOREGRESSIVE SPECTRAL DENSITIES
Emanuel Parzen Jun. 1982 14 p refs
(Contracts N00014-82-MF-2001; DAAG29-80-C-0070)
(AD-A117263; TR-N-30) Avail: NTIS HC A02/MF A01 CSCL 12/1

A new proof is given of the maximum entropy characterization of autoregressive spectral densities as models for the spectral density of a stationary time series. The new proof is presented in parallel with a proof of the maximum entropy characterization of exponential models for probability densities. Concepts of entropy, cross-entropy, and information divergence are defined for probability densities and for spectral densities. Author (GRA)

N82-34176# Texas A&M Univ., College Station. Inst. of Statistics.
SIMULTANEOUS CONFIDENCE BANDS FOR AUTOREGRESSIVE SPECTRA
H. Joseph Newton and Marcello Pagano Jun. 1982 15 p refs
(Contracts N00014-82-MP-2001; DAAG29-80-C-0070)
(AD-A117072; TR-N-32) Avail: NTIS HC A02/MF A01 CSCL 12/1

Autogressive spectral estimation has become an important method of spectral estimation in recent years despite (1) a continuing discussion of the problems of order determination and (2) a lack of easily applied procedures for determining confidence intervals or bands on the function being estimated. In this paper, we derive asymptotic 100 (1-alpha)% simultaneous confidence bands for an autoregressive spectral density assuming one has data from a finite order autoregressive process with known order or conditional upon having correctly determined the order if it is unknown. The bands are derived in section 2 and their implementation described on simulated data in section 3. GRA

N82-34177# Yale Univ., New Haven, Conn. Foundation for Research in Economics.
STOCHASTIC GAMES. 1: FOUNDATIONS
Curt Alfred Monash Apr. 1982 18 p refs Sponsored in part by NSF
(Contract N00014-77-C-0518)
(AD-A117085; DISCUSSION-PAPER-623) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper strives to provide a sound underpinning for the theory of stochastic games. Section 2 is a reworking of the Bewley-Kohlberg result integrated with Shapley's; the black magic of Tarski's principle is replaced by the gray magic of the Hilbert Nullstellensatz. Section 3 explicates the underlying topology and measure theory; I believe it is as necessary for Mertens and Neyman's proof of the minmax theorem as it is for mine. Finally, Section 4 establishes a result on this sort of structure which may be of some independent interest. GRA

N82-34178# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
NOMBAS: A BAYESIAN PROCEDURE FOR SELECTING THE GREATEST MEAN
Alan R. Washburn Jun. 1982 24 p refs
(RR0000110)
(AD-A117611; NPS55-82-017) Avail: NTIS HC A02/MF A01 CSCL 12/1

NOMBAS is an acronym for NOrmal Myopic Bayes Sequential, and is the name of a Bayesian procedure for selecting the category with the greatest mean. This paper describes NOMBAS in detail and then compares it with other procedures on the basis of Bayes risk versus average sample number. Author (GRA)

N82-34179# Army Construction Engineering Research Lab., Champaign, Ill.
SPECTRAL EQUIVALENCE OF DETERMINISTIC AND STOCHASTIC MODELS FOR TIME SERIES WITH A PERIODIC COMPONENT Final Report
Michael John OConnor May 1982 75 p refs
(DA Proj. 4A1-61101-A-91-D)
(AD-A117718; CERL-TM-P-130) Avail: NTIS HC A04/MF A01 CSCL 12/1

Time series encountered in engineering applications typically contain strongly periodic behavior because of the dynamics of the underlying physical system. Several different approaches are being used to model this type of time series. However, in the time series literature there is little agreement about the appropriateness of alternative models. Author (GRA)

N82-34180# Princeton Univ., N. J. Dept. of Statistics.
LOGARITHMIC DERIVATIVES OF TWO NORMALIZING FUNCTIONS
Geoffrey S. Watson Sep. 1981 28 p refs
(Contract N00014-79-C-0322)
(AD-A117516; TR-204-Ser-2) Avail: NTIS HC A02/MF A01 CSCL 12/1

A self-contained study is presented of the functions A(q)(kappa), B(q)(kappa), of the computational problems of calculating these functions, of solving, y A(q)(kappa) and Y B(q)(kappa), and of finding the variance stabilizing transformations. J.M.S.

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-34181# Desmatics, Inc., State College, Pa.
INTERRUPTIBLE SUPERSATURATED TWO-LEVEL DESIGNS
James L. Rosenberger (Pennsylvania State Univ., State College) and Dennis E. Smith Jun. 1982 17 p refs
(Contract N00014-75-C-1054; NR Proj. 042-334)
(AD-A115786; TR-106-11) Avail: NTIS HC A02/MF A01 CSCL 12/2

Interruptible designs posses a robustness against possible premature termination of an experiment. We consider such two-level designs for a first-order model and present interruptible

sequences which lead to the D-optimal saturated design for four to nine factors. Premature terminations of the experiment at any stage results in a supersaturated design with minimum loss of information about the factors. The loss of these designs which is measured by the pairwise orthogonality between columns, is compared with that of the worst case for randomly ordered sequences. Author (GRA)

N82-34182# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
STOCHASTIC AND ADAPTIVE SYSTEMS Final Report, 1 Feb. 1977 - 31 Jan. 1982
Michael Athans, Sanjoy K. Mitter, and Lena Valavani Mar. 1982 35 p refs
(Grant AF-AFOSR-3281-77; AF Proj. 2304)
(AD-A117029; LIDS-FR-1188; AFOSR-82-0529TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

This final report describes the research carried out under the AFOSR grant. Research was carried out on the following main topics: (1) realization theory for stochastic systems; (2) linear and nonlinear filtering; (3) stochastic control; and (4) adaptive control. Technical details of the research may be found in the reports, theses, and papers cited in the references. A list of publications supported wholly or partially by this grant is included at the end of this report. Author (GRA)

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

No abstracts in this category.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar physics.*

N82-34183*# Naval Research Lab., Washington, D. C. Geophysical and Plasma Dynamics Branch.
EFFECT OF MAGNETIC SHEAR ON THE ELECTROSTATIC ION CYCLOTRON WAVES IN MAGNETOSPHERIC PLASMAS
G. Ganguli (Berkeley Scholars, Inc., Springfield, Va.) and P. Palmadesso 18 Jun. 1982 22 p refs Sponsored in part by NASA
(NASA-CR-169229; NAS 1.26:169229; AD-A116053; NRL-MR-4824) Avail: NTIS HC A02/MF A01 CSCL 20/3

The importance of the effect of the magnetic shear on the current driven ion-cyclotron instability for the space plasmas is illustrated. A non-local treatment is used. Even for infinitesimal magnetic shear a large reduction in the growth rate is found along with a noteworthy reduction in the band of the unstable perpendicular wavelengths. The latter effect leads to an enhanced coherence as has been previously observed in the S3-3 data for electrostatic non-cyclotron waves. Author (GRA)

N82-34184# Colorado State Univ., Fort Collins. Dept. of Physics.
MAGNETIC PROPERTIES OF LITHIUM FERRITE MICROWAVE MATERIALS Final Report, 1 Oct. 1977 - 15 Apr. 1982
Carl E. Patton Jul. 1982 14 p refs
(Contract DAAG29-80-K-0084; Grant DAAG29-77-G-0209)
(AD-A116907; ARO-15242.10-EL; ARO-17664.4-EL) Avail: NTIS HC A02/MF A01 CSCL 20/3

This report summarizes work accomplished including publications, participating personnel and degrees awarded. Of particular note are the results concerning the high field magnetization in Li-Zn ferrite, effects of oxygen firing of polycrystalline Li-ferrite, the effect of substitutions in Li-Co ferrite on the anisotropy and microwave properties, and the understanding of nonlinear microwave processes in ferrites. Some groundwork has also been done on very high frequency (mm wave) material strategies. GRA

N82-34185# Louisiana State Univ., Baton Rouge. Dept. of Physics and Astronomy.
INTER-SUBBAND OPTICAL ABSORPTION IN AN INVERSE LAYER ON A SEMICONDUCTOR SURFACE IN TILTED MAGNETIC FIELDS
R. F. OConnell 1982 14 p refs
(Contract DE-AS05-79ER-10459)
(DE82-011591; DOE/ER-10459/28) Avail: NTIS HC A02/MF A01

Faraday rotation and other magneto-optical penomena in MOS (metal oxide semiconductor) systems were investigated. These studies led to three spin-off investigations: (1) multiple-relection effects a discrepancy between two existing models was identified and the correct model was generalized as a basis for enabling consideration of such effects in MOS systems); (2) magneto-transmission in an electron inversion layer of finite thickness (which permits the calculation of the surface conductivity); and (3) absorption of radiation propagating obliquely in a magnetoplasma. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N82-34186*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SONIC BOOM MEASUREMENT TEST PLAN FOR SPACE SHUTTLE STS-2 REENTRY
Herbert R. Henderson Nov. 1981 32 p ref
(NASA-TM-84858; NAS 1.15:84858) Avail: NTIS HC A03MF A01 CSCL 20A

Procedures and system specifications associated with the space shuttle STS-2 sonic boom measurement program are described. Specifically included are details such as mobile data acquisition station locations, measurement systems calibration levels, predicted sonic boom overpressure levels, overpressure level assignment for each data acquisition station, data recording times on and off, universal coordinate time, and measurement system descriptions. M.G.

N82-34187*# College of William and Mary, Newport News, Va.
BROAD BAND SOUND FROM WIND TURBINE GENERATORS
H. H. Hubbard, K. P. Shepherd, and F. W. Grosveld Nov. 1981 16 p refs Presented at the 102nd Meeting of the Acoust. Soc. of Am., Miami Beach, Fla., 1-4 Dec. 1981 Prepared in cooperation with Bionetics Corp., Hampton, Va.
(Contract NAS1-14970; Grant NAG1-166)
(NASA-CR-165810; NAS 1.26:165810) Avail: NTIS HC A02/MF A01 CSCL 20A

Brief descriptions are given of the various types of large wind turbines and their sound characteristics. Candidate sources of broadband sound are identified and are rank ordered for a large upwind configuration wind turbine generator for which data are available. The rotor is noted to be the main source of broadband sound which arises from inflow turbulence and from the interactions of the turbulent boundary layer on the blade with its trailing edge. Sound is radiated about equally in all directions but the refraction effects of the wind produce an elongated contour pattern in the downwind direction. Author

N82-34188*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NOISE MEASUREMENT IN WIND TUNNELS, WORKSHOP SUMMARY
David H. Hickley (RAE, Farnborough, England) and John Williams (RAE, Farnborough, England) Sep. 1982 36 p refs Workshop on Aeroacoustics Tunnel Testing Techniques held at Moffett Field,

Calif., Mar. 1979
(NASA-TM-84219; A-8843; NAS 1.15:84219) Avail: NTIS HC A03/MF A01 CSCL 20A

In reviewing the progress made in acoustic measurements in wind tunnels over the 5-yr span of the workshops, it is evident that a great deal of progress has occurred. Specialized facilities are now on line, special measurement techniques were developed, and corrections were devised and proven. This capability is in the process of creating a new and more correct data bank on acoustic phenomena, and represents a major step forward in acoustics technology. Additional work is still required, but now, rather than concentrating on facilities and techniques, researchers may more profitably concentrate on noise-source modeling, with the simulation of propulsor noise source (in flight) and of propulsor/airframe airflow characteristics. Promising developments in directional acoustic receivers and other discrimination/correlation techniques should now be regularly exploited, in part for model noise-source diagnosis, but also to expedite extraction of the lone source signal from any residual background noise and reverberation in the working chamber and from parasitic noise due to essential rigs or instrumentation inside the airstream. A.R.H.

N82-34189*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUPERSONIC JET NOISE GENERATED BY LARGE SCALE INSTABILITIES
John M. Seiner, Dennis K. McLaughlin (Dynamics Technology, Inc.), and C. H. Liu Sep. 1982 45 p refs
(NASA-TP-2072; L-15307; NAS 1.60:2072) Avail: NTIS HC A03/MF A01 CSCL 20A

The role of large scale wavelike structures as the major mechanism for supersonic jet noise emission is examined. With the use of aerodynamic and acoustic data for low Reynolds number, supersonic jets at and below 70 thousand comparisons are made with flow fluctuation and acoustic measurements in high Reynolds number, supersonic jets. These comparisons show that a similar physical mechanism governs the generation of sound emitted in the principal noise direction. These experimental data are further compared with a linear instability theory whose prediction for the axial location of peak wave amplitude agrees satisfactorily with measured phased averaged flow fluctuation data in the low Reynolds number jets. The agreement between theory and experiment in the high Reynolds number flow differs as to the axial location for peak flow fluctuations and predicts an apparent origin for sound emission far upstream of the measured acoustic data. S L.

N82-34190*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CIRCUMFERENTIALLY SEGMENTED DUCT LINES OPTIMIZED FOR AXISYMMETRIC AND STANDING WAVE SOURCES
Willie R. Watson 1982 50 p refs
(NASA-TP-2075; L-15316; NAS 1.60:2075) Avail: NTIS HC A03/MF A01 CSCL 20A

Optimum and off-optimum properties of circumferentially segmented duct liners are compared with those of uniform liners to identify any potential benefits of circumferentially segmented liners. High- and low-order spinning-mode sources are considered in the study. The solution for the segmented liner is obtained by a multimodal expansion of the segmented-liner eigenmodes in terms of a series of hardwall duct models. The coefficients in the hard-wall series are obtained by using Galerkin's method. Results show that for some frequencies and duct lengths, circumferentially segmented liners scatter energy equally between a higher and lower order circumferential wave number. Studies for higher order spinning-mode sources show that an optimized segmented liner with a hard-wall/soft-wal admittance variation representing an optimum configuration gives better performance than an optimized uniform liner. Overall, the greatest benefit of the segmented liner over the uniform liner occurs under off-optimum conditions. The optimized segmented liner gives more effective broadband performance than the optimized uniform liner. Author

N82-34191*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMULATION OF THE FLUCTUATING FIELD OF A FORCED JET
Alvin Bayliss (New York Univ., N.Y.), Lucio Maestrello, and Eli Turkel (Tel Aviv Univ.) Aug. 1982 15 p refs
(Contracts NAS1-14472; NAS1-16934; DE-AC02-76ER-03077; Grant AF-AFOSR-2881-76)
(NASA-TM-84506; NAS 1.15:84506) Avail: NTIS HC A02/MF A01 CSCL 20A

The fluctuating field of a jet excited by transient mass injection is simulated numerically. The model is developed by expanding the state vector as a mean state plus a fluctuating state. Nonlinear terms are not neglected and the effect of nonlinearity is studied. The results show a significant spectral broadening in the flow field due to the nonlinearity. In addition, large scale structures are broken down into smaller scales. Author

N82-34192# Naval Postgraduate School, Monterey, Calif.
FINITE-AMPLITUDE STANDING WAVES IN A CAVITY WITH BOUNDARY PERTURBATIONS
A. B. Coppens, J. V. Sanders, and I. Joung Apr. 1982 61 p refs
(RR0320101)
(AD-A115719; NPS61-82-005) Avail: NTIS HC A04/MF A01 CSCL 20/1

Finite amplitude acoustic standing waves in a rectangular air-filled cavity with various wedge-shape boundary perturbations were studied both experimentally and theoretically. The experimental results show that geometrical perturbations alter the finite-amplitude behavior of the cavity and that the nature of these changes are in qualitative agreement with the predictions of the theory. However, quantitative agreement was not observed, possibly because the perturbation chosen did not satisfy all the assumptions of theory. Author (GRA)

N82-34193# Delaware Univ., Newark. Dept. of Mathematical Sciences.
THE INVERSE SCATTERING PROBLEM FOR ACOUSTIC WAVES
David Colton Mar. 1982 22 p refs
(Grants AF-AFOSR-0543-82; AF-AFOSR-0085-79; AF-AFOSR-0103-81)
(AD-A117048; AFOSR-82-0543TR; TR-120A) Avail: NTIS HC A02/MF A01 CSCL 20/1

We first make a distinction between 'scattering' and 'diffraction' and note that the latter is basically a high frequency phenomena whereas the former is more accurately applied to low and intermediate values of the frequency. In this paper we shall not discuss any of the important new results on the 'inverse diffraction problem' but instead refer the reader to the recent paper of Brian Sleeman for a survey of these results. We shall further restrict our attention to the scattering of a plane time harmonic wave by a fixed bounded obstacle situated in a homogeneous medium and in particular to determine information about this obstacle from a knowledge of the asymptotic behavior of the scattered wave. Hence, we are excluding such topics as the scattering of waves by moving obstacles, the determination of the speed of sound in a non-homogeneous medium, and the location of equivalent sources. Finally, we shall only be concerned with determining two basic properties of the scattering obstacle, viz. its shape and/or its surface impedance. GRA

N82-34194# Texas Univ., Austin. Applied Research Labs.
ON THE CURRENT STATUS OF THEORETICAL MODELING OF ACOUSTIC WAVES IN SATURATED SEDIMENTS
Anthony Bedford Jun. 1982 14 p refs
(Contract N00014-76-C-0117)
(AD-A117847; ARL-TR-82-32) Avail: NTIS HC A02/MF A01 CSCL 20/1

A brief, critical discussion is given of efforts to develop theoretical models for wave propagation in saturated marine sediments. The modeling of propagation in unbounted media is

considered as well as the problem of wave reflection at the water/saturated sediment interface. It is concluded that, while important and substantial process has been made, much work remains, particularly with regard to the characterization of the viscoelastic properties of sediments at low frequencies. GRA

N82-34195# Georgetown Univ., Washington, D.C. Dept. of Physics.
AN ANALYTICAL SOLUTION TO THE PROBLEMS OF 3-PHONON INTERACTION AND SECOND HARMONIC GENERATION IN A SOLID PLATE Ph.D. Thesis
Tai San Chao and G. Mayer Walter Aug. 1982 101 p refs
(Contract N00014-78-C-0584)
(AD-A117907; GUUS-08825; TR-5) Avail: NTIS HC A06/MF A01 CSCL 20/1

A Green's function approach is used to determine the conditions under which it is possible to generate second harmonics of Lamb waves on solid plates and to have two Lamb waves interact to produce a third phonon (another Lamb mode). Author (GRA)

N82-34196# Institut Franco-Allemand de Recherches, St. Louis (France).
STUDY OF THE SOURCE FUNCTION BY THE CAUSALITY METHODS DEFINED BY RIBNER AND SIDDON
M. Schaffar Nov. 1980 22 p refs In FRENCH; ENGLISH summary
(PB82-205170; AAF-80-52) Avail: NTIS HC A02/MF A01 CSCL 20A

Within the framework of Lighthill's acoustic analogy the causality technique defined by Ribner and Siddon is applied to determine the localization of the equivalent source function in a cold subsonic jet. Two methods are developed, using the above-mentioned acoustic analogy and the causality technique. The two methods give differing results. The first, which measures jet speed with a laser speed measuring device, locates the origin of sound in the duct. The second is based on the Dalembertian measurement device, more sensitive to high frequency sound produced at the wide angles of the mixing zones. Low frequency noise is located at the end of the power cone and in the transition zone. For more high frequency noises an experiment is currently underway, using the Dalembert measuring device. GRA

N82-33565# Ohio State Univ., Columbus. Mechanical Engineering Dept.
ACOUSTIC IMPEDANCE MEASUREMENT METHODS
R. Singh *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 14, No. 2 Feb. 1982 p 3-10 refs (For primary document see N82-33564 24-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/1

N82-34337# Open Univ., Milton (England).
SOUND ATTENUATION OVER GROUND COVER 3
K. Attenborough *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 13, No. 11 Nov. 1981 p 3-6 refs (For primary document see N82-34336 24-99)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/1

N82-34338# Maryland Univ., College Park. Dept. of Mechanical Engineering.
VORTEX SHEDDING FROM CYLINDERS AND THE RESULTING UNSTEADY FORCES AND FLOW PHENOMENON, PART 1
S. T. Fleischmann and D. W. Sallet *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 13, No. 11 Nov. 1981 p 9-22 refs (For primary document see N82-34336 24-99)
Avail: SVIC, Code 5804, Naval Research Lab., Washington D.C. 20375 CSCL 20/1

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-34197*# Stanford Univ., Calif. Inst. for Plasma Research.
EMISSION, ABSORPTION AND POLARIZATION OF SYNCHROTRON RADIATION OF MILDLY RELATIVISTIC PARICLES
Vahe Petrosian and James M. McTiernan 28 Sep. 1982 21 p refs
(Grant NGR-05-020-668)
(NASA-CR-169416; NAS 1.26:169416) Avail: NTIS HC A02/MF A01 CSCL 20H

Approximate analytic expressions for the emissivity and absorption coefficient of synchrotron radiation of mildly relativistic particles with an arbitrary energy spectrum and pitch angle distribution are given. From these, an expression for the degree of polarization is derived. To accomplish this, previously developed methods of integration are used. The analytic results are compared with numerical results for both thermal and non-thermal (power law) distributions of particles. R.J.F.

N82-34198# National Bureau of Standards, Washington, D.C. National Measurement Lab.
TRIPLY DIFFERENTIAL STUDIES OF ATOMIC AND MOLECULAR PHOTOIONIZATION USING SYNCHROTRON RADIATION Annual Summary Report, 1 Oct. 1981 - 30 Sep. 1982
J. L. Dehmer (Argonne National Lab., Ill.), Albert C. Parr, and Roger Stockbauer 19 Jul. 1982 13 p
(Contract N00014-82-F-0011)
(AD-A117247) Avail: NTIS HC A02/MF A01 CSCL 07/4

Basic studies of the dynamics and spectroscopy of atomic and molecular photoionization have been carried out using three experimental probes. The first and most extensively used experimental approach involves triply differential (differential in incident wavelength, electron energy, and ejection angle) photoelectron measurements using synchrotron radiation. Measurements were conducted in the vacuum ultraviolet wavelength range up to hv approx. 35 eV on a large variety of atomic and molecular systems. Photoelectron branching ratios and angular distributions were obtained for all accessible states. A major emphasis of this work involved the initial exploration of novel effects of autoionization and shape resonances on alternative vibrational ionization channels. The second experimental approach entailed measuring the polarization of fluorescence following production of excited molecular ions by photoionization. This experiment allowed the direct measurement of the alignment of molecular ions produced by photoionization and, simultaneously, the branching ratios for degenerate photoelectron channels. The third experimental approach involved determining the photoelectron spectrum of an atomic cluster (Xe3) in a mixture of clusters formed in a supersonic expansion by the technique of photoion-photoelectron coincidence. Author (GRA)

N82-34199# Rockwell International Science Center, Thousand Oaks, Calif.
GROWTH OF HgCdTe BY MODIFIED MOLECULAR BEAM EPITAXY Semiannual Technical Report, 1 Sep. 1981 - 28 Feb. 1982
J. T. Cheung 15 Jun. 1982 33 p
(Contract MDA903-79-C-0188; DARPA Order 3704)
(AD-A117752; SC5202.17SA; SATR-5) Avail: NTIS HC A03/MF A01 CSCL 20/8

Films of Hgl-xCdxTe and ZnO can be formed by the LADA technique. Their results will be presented separately. HgO.7CdO. 3Te films have specular surface morphology and sharp interfaces with a cross diffusion region of 1500 A. Electron mobility at 77K as high as 19,000 sq cm/V-s was observed. SIMS profile analysis indicated large accumulation of impurities at the interface and near the surface, MIS devices were fabricated and their results will be presented. ZnO films can be formed by evaporating from ZnO powder pellets with a pulsed carbon dioxide laser (lambda =10.6 micrometers). Films from 0.1 to 1.0 micrometers thick were deposited on various substrates in a wide range of temperatures. At substrate temperatures above 250 C, the deposited films are colorless and transparent. The surface is smooth with no discernable features, even under 1000x magnification. The films are highly

oriented along the C-axis. X-ray diffraction patterns indicate a single (0001) peak with a half width (2 theta) about 0.3-0.35 degrees. This is comparable to the ZnO films deposited by the state-of-the-art magnetron sputtering technique. GRA

N82-34200# Michigan State Univ., East Lansing. Dept. of Chemistry.
STRUCTURES AND FRAGMENTATION MECHANICS OF THE IONS OF ETHANOL BY TRIPLE QUADRUPOLE MASS SPECTROMETRY Interim Report
R. Kazmer Latven, Margaret B. McFarland, and Christie G. Enke 15 Jul. 1982 29 p refs
(Contract N00014-76-C-1092)
(AD-A117442; TR-9) Avail: NTIS HC A03/MF A01 CSCL 07/4

The low energy (10-25 eV) collisionally activated decomposition of the molecular ion and of some important fragment ions of ethanol, ethanol-OD, and 2,2,2-d3 ethanol has been studied by triple quadrupole mass spectrometry to obtain information regarding the ions' structures and fragmentation pathways. In this technique, ions generated by electron impact in the mass spectrometer ion source are mass selected in the first quadrupole, undergo collisionally activated decomposition (CAD) in the second, RF-only, quadrupole collision cell, and the resulting daughter ions are mass analyzed by the third quadrupole. The unit resolving power of the final quadrupole analyzer is a distinct advantage over other implementations of MS/MS in that structural information contained in deuterated species is readily obtainable. Ethanol ions thus studied include (CH3CH2OH)+, (CH3CHOH)+, (CH2COH)+, (CH2CO)=, (CH3OH)= and (CH2OH)=. Fragmentation mechanisms based on CAD spectra are consistent with the fragmentation of a particular ion's deuterated analogs. The elucidation of the decomposition mechanism leads to an unambiquous assignment of parent ion structure in many cases. The observed dissociations parallel closely those observed in both electron impact and high energy CID in sector instruments. The data suggest that fragmentation reactions which follow electron impact and collisional activation at both high and low energies are at least qualitatively independent of the method of excitation. GRA

N82-34201# Avco-Everett Research Lab., Mass.
RESEARCH ON SOURCES OF GAS PHASE METASTABLE ATOMS AND MOLECULES Final Technical Report, 15 Aug. 1979 - 15 Feb. 1982
R. C. Slatner, H. A. Hyman, D. Trainor, and A. Flusberg Wright-Patterson AFB, Ohio AFWAL May 1982 135 p refs
(Contract F33615-79-C-2051)
(AD-A117672; AFWAL-TR-82-2029) Avail: NTIS HC A07/MF A01 CSCL 20/8

This study is concerned with the development of new types of sources for the production of metastable atoms and molecules. In the context of the present study, the term metastable means any excited atomic or molecular species with a relatively long radiative lifetime. Several separate tasks were undertaken under this program. The literature was searched, and a review of radiative lifetimes and radiative decay mechanisms was compiled for a representative number of atomic and molecular systems of interest to such diverse areas as gas discharge physics, chemical physics, flame chemistry and plasma physics. A second task involved a literature review of prior basic research metastable sources followed by the development and experimental testing of appropriate candidate sources for the production of rare gas atomic and molecular metastable species. Four methods for producing high fluxes of metastable atoms and molecules were investigated theoretically and modeled. Methods for the storage of metastables for times up to the radiative lifetime were also investigated. A preliminary discussion of an optical trap technique is described. GRA

N82-34202# New York Univ., New York. Dept. of Chemistry.
ANOMALOUS REORGANIZATION FREE ENERGIES IN OPTICAL ELECTRON TRANSFER IN SOLUTION
Paul Delahay Jun. 1982 24 p refs Submitted for publication
(Contract N00014-82-K-0113; NR Proj. 359-258)
(AD-A117680; TR-1) Avail: NTIS HC A02/MF A01 CSCL 20/8

Autoionization bands are observed in the photoelectron emission spectroscopy of aqueous solutions of cyanometalate complexes (Mn, Fe, W, Mo), anions (NO(-)3, ClO(-)4) and cations (Ag(+), Tl(+)). Reorganization free energies for autoionization bands are anomalously low in absolute value (by ca. 1 eV) in comparison with direct transitions to the continuum. Interpretation is based on potential energy profiles and model calculations for the reorganization free energy. GRA

N82-34203# Brookhaven National Lab., Upton, N. Y.
EXTRAPOLATION ALGORITHMS AND THEIR USE FOR THE EVALUATION OF BEAM-BEAM EFFECTS ON THE MOTION AND POLARIZATION OF PARTICLES IN STORAGE RINGS
M. Pusterla 13 Oct. 1981 22 p refs
(Contract DE-AC02-76CH-00016)
(DE82-011425; BNL-51465) Avail: NTIS HC A02/MF A01

A proposal of using extrapolation algorithms as an analytical numerical tool for the evaluation of the beam-beam effects in storage rings is formulated. These known algorithms are described. Physical models for the beam-beam interaction effects on betatron motion and polarization of a test particle are discussed and put in such a form as to allow the application of the extrapolation algorithms. DOE

N82-34204# Sao Paulo Univ. (Brazil). Inst. de Fisica.
SIMPLE WAY OF SOLVING THE HYDROGEN ATOM PROBLEM
I. Kimel Sep. 1980 12 p refs
(DE82-700020; IFUSP-P232) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

The eigenvalues and eigenfunctions for the hydrogen atom Schroedinger equation can be easily obtained after factorizing that equation in appropriate ways. The resulting factors resemble the creation and annihilation operators that Dirac introduced for the harmonic oscillator. DOE

N82-34205# Oregon Univ., Eugene. Inst. of Theoretical Science.
CENTRAL PRODUCTION AND SMALL-ANGLE ELASTIC SCATTERING IN THE VALON MODEL
Rudolph C. Hwa Jul. 1981 12 p refs Presented at the 12th Intern. Symp. on Multiparticle Dyn., Notre Dame, Ind., 21-26 Jun. 1981
(Contract DE-AT06-76ER-70004)
(DE82-008367; DOE/ER-70004/317; OITS-173) Avail: NTIS HC A02/MF A01

The valon model is applied to the problem of particle production in the central region. Using the recombination mechanism for hadronization, a constraint is obtained on the plateau heights of produced pions and protons. The available data are in rough agreement with that constraint. The problem of elastic scattering at small angles is then investigated in the valon model. It is shown that various familiar properties follow as simple consequences of the model. They are: additive quark model for total cross sections, droplet model for d sigma/dt at small t, and Regge behavior with some new constraints on Regge residues. DOE

N82-34206# Georgia Univ., Athens. Dept. of Physics.
HIGH ENERGY HADRON-HADRON COLLISIONS Annual Progress Report
T. T. Chou Jan. 1982 14 p refs
(Contract DE-AS09-76ER-00946)
(DE82-011255; DOE/ER-00946/5) Avail: NTIS HC A02/MF A01

Work on high energy hadron-hadron collisions in the geometrical model is summarized. Specific items that were studied last year include the dip movement in pp and anti pp elastic collisions, asymptotic behavior at very high energies for hadron-hadron collision, relation between dip structure in (LC OMEGA) p elastic scattering and the pion form factor, and pion-nucleus diffraction dissociation. DOE

N82-34207# Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.

INELASTIC INTERACTIONS OF 4.5 GeV/c PROTONS WITH EMULSION NUCLEI NOT ACCOMPANIED BY RELATIVISTIC CHARGED PARTICLES

M. Sumbera and S. Vokal 1981 9 p refs

(DE82-701020; JINR-E-1-81-436) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Experimental results on proton-emulsion interactions without charged particles creation are presented and analyzed. The role of this type of events through nonnegligible at energies of several GeV decreases rapidly with increasing projectile energy. Except for broader multiplicity distribution of gray particles all other characteristics are similar to the case of multiple production. A comparison to the cascade evaporation model has been made and reasonable agreement has been found. DOE

N82-34208# Arizona Univ., Tucson. Optical Sciences Center.

RESEARCH DIRECTED AT DEVELOPING A CLASSICAL THEORY TO DESCRIBE ISOTOPE SEPARATION OF POLYATOMIC MOLECULES ILLUMINATED BY INTENSE INFRARED RADIATION Final Report, 7 May - 30 Sep. 1979

W. E. Lamb, Jr. Dec. 1981 10 p

(Contract DE-AS02-77ET-33011)

(DE82-009652; DOE/ET-33011/T1) Avail: NTIS HC A02/MF A01

The theory of isotope separation produced by the illumination of polyatomic molecules by intense infrared laser radiation was examined. This process is investigated by treating the molecule, sulfur hexafluoride, as a system of seven classical particles that obey the Newtonian equations of motion. A minicomputer is used to integrate these differential equations. The particles are acted on by interatomic forces, and by the time dependent electric field of the laser. An expression for the interaction of the laser and the molecule which is compatible with infrared absorption and spectroscopic data is presented. Computer runs of the dynamic behavior of the molecule were performed using a reasonably good model for the interatomic force law. Typically the molecule passes quickly through the resonance region into the quasi-continuum and even well into the real continuum before dissociation actually occurs. When viewed on a display terminal, the motions are exceedingly complex. As an aid to the visualization of the process, 16 mm movies depicting a three dimensional representation of the motion of the seven particles show clearly the enormous complexity of the motions, and make clear the desirability of finding ways of characterizing the motion in simple ways without giving all of the numerical detail. One of the ways to do this is to introduce statistical parameters such as a temperature associated with the distribution of kinetic energies of the single particle. Indications that such methods will prove useful in keeping track of the dynamic histories were found. DOE

N82-34209# Fermi National Accelerator Lab., Batavia, Ill.

VERSATILE SECONDARY BEAM FOR THE MESON AREA

T. Kirk Mar. 1982 31 p refs

(Contract DE-AC02-76CH-03000)

(DE82-014275; FNAL-TM-1098) Avail: NTIS HC A03/MF A01

A new secondary beam design is outlined for the Meson M6 Beamline that combines versatility with economy. The beamline described transports charged particles of either sign to 800 GeV/c and brings the beam to a focus in one of three potential experimental areas. The plan makes maximal use of existing civil construction. DOE

N82-34210# Los Alamos Scientific Lab., N. Mex.

IMPORTANCE OF ELASTIC SCATTERING TO PARTICLE DIRECTION DETERMINATION IN MONTE CARLO CALCULATIONS OF DT REACTIONS IN FLIGHT

Joseph J. Devaney Apr. 1982 12 p refs

(Contract W-7405-eng-36)

(DE82-015080; LA-9306-MS) Avail: NTIS HC A02/MF A01

The importance of single, large-angle, nuclear-coulombic, nuclear-hadronic, hadronic-coulombic interference, and multiple nuclear-coulombic scattering is investigated for tritons incident on deuterium, iron, and plutonium for very high temperatures and densities and for ordinary liquid and solid densities at low temperature. Depending on the accuracy desired, we conclude that for 10-keV-temperature DT plasmas it is not necessary to include elastic scattering deflection in reaction-in-flight calculations. For higher temperatures or where angular accuracies greater than 100 are significant or for higher Z targets or for other special circumstances, one must include elastic scattering from coulomb forces. DOE

N82-34211# Oak Ridge National Lab., Tenn.

NEGATIVE-ION-BEAM GENERATION WITH THE ORNL SITEX SOURCE

W. K. Dagenhart, W. L. Stirling, and J. Kim May 1982 80 p refs

(Contract W-7405-eng-26)

(DE82-016042; ORNL/TM-7895) Avail: NTIS HC A05/MF A01

Parametric studies were made on a hot cathode reflex discharge H(-) surface ionization source with transverse extraction (SITEX) in both the pure hydrogen and the mixed hydrogen cesium mode. Extraction current density, beam current, gas efficiency, extracted electron to H(-) current ratio, heavy negative ion impurities, optics, and long pulse operation were investigated as a function of time, are voltage, arc current, converter voltage, H2 gas flow, cesium feed rate, and plasma generator geometries. Initial results of the research were an extracted H(-) beam current density of 56 mA/cm(2) at 23 mA for 5 s pulses and, gas efficiency of 3%, theta (perpendicular) (1/e) approx. 2 + or - 1 deg, theta (parallel) (1/e) approx. 1 + or - 1 deg, at a beam energy of 25 keV. Negative heavy ion beam impurities were reduced to < 1% at low current densities. H(-) ions are produced principally by positive ion surface conversion using elemental cesium fractional monolayer coverage on a molybdenum converter substrate, which is biased negatively with respect to the anode. DOE

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N82-34212# McDonnell-Douglas Research Labs., St. Louis, Mo.

SHORT-PULSE ELECTRON-BEAM PROPAGATION EXPERIMENTS IN A CONTROLLED-ENVIRONMENT CHAMBER Final Technical Report, 8 Jun. 1981 - 8 Mar. 1982

M. A. Greenspan 8 Mar. 1982 35 p refs

(Contract N60921-81-C-0152)

(AD-A116999; MDC-Q0762) Avail: NTIS HC A03/MF A01 CSCL 20/7

Propagation of a 500-keV, 6-kA, 3-ns electron beam in air has been studied in a 3.4 m diam controlled-environment chamber at pressures of 75-1600 Pa (0.56-12 Torr). Open-shutter photography, Faraday cup, and magnetic-field probe measurements were performed, and results were compared with those obtained for beam propagation in a 7.6 cm diam glass tube. Over a propagation window of 270-800 Pa, rectilinear propagation to within < or approx. 5 mrad was observed despite the lack of guide tube walls. Propagation at the low end of the window was limited by rapid nose-erosion rates of up to 10 cm/ns. At optimal propagation pressures (400-550 Pa), magnetic probe data were used to estimate induced electric fields and nose erosion caused by ohmic energy loss. Results were consistent with Faraday cup and calorimeter data. At higher pressures, propagation was erratic, and appeared to be terminated by the lack of a stable pinch formation. For those shots where propagation was observed at pressures above 550 Pa, Faraday cup traces show a loss of the beam tail.

Author (GRA)

N82-34213# American Science and Engineering, Inc., Arlington, Va. Space Systems Div.

A PROGRAM TO STUDY THE DETECTION OF TARGET HITS BY DIRECTED ENERGY WEAPONS Final Report, 1 Apr.

1981 - 31 Mar. 1982
J. K. Silk Mar. 1982 47 p refs
(Contract F49620-81-C-0045; AF Proj. 2301)
(AD-A117711; ASE-4700; AFOSR-82-0571TR) Avail: NTIS HC A03/MF A01 CSCL 15/7

This is the final report on a study of the detection, using X-ray emission signatures, of target hits by natural particle beam directed energy weapons. We find that the energy deposition needed for a detectable signature is a small fraction of that required for lethality. This result causes optimism about the feasibility of X-ray hit detection. Two potential obstacles up to detection were considered: The naturally occurring background and absorption by the residual atmosphere. Spectral discrimination can solve the background problem. The emitted spectrum contains characteristic X-rays, especially K-lines. For metallic targets, the background is small at the characteristic wavelength. The background contribution can be suppressed by narrowing the bandpass. Absorption by the residual atmosphere is negligible above 200 km altitude. At lower altitudes, attentuation is unimportant for nickel or steel targets, but significant for materials with longer wavelength K-lines. The ranges of beam/detector parameter values over which detection is possible are presented. The next steps should be implementation studies. Large area detectors with spectral discrimination are needed. Collecting optics using synthetic multilayer structures are a promising approach. Author (GRA)

N82-34214# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
ENVIRONMENTAL ASSESSMENT MODEL FOR SHALLOW LAND DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTES
Craig A. Little, David E. Fields, Craig J. Emerson, and Goro Hiromoto (Inst. de Pesquisas Energeticas e Nucleares) Sep. 1981 131 p refs
(Contracts W-7405-eng-26; EPA-D-89-F-000-60)
(DE82-001830; ORNL/TM-7943) Avail: NTIS HC A07/MF A01

The PRESTO (Prediction of Radiation Effects from Shallow Trench Operations) computer code developed to evaluate health effects from shallow land burial trenches is described. This generic model assesses radionuclide transport, ensuing exposure, and health impact to a static local population for a 1000 y period following the end of burial operations. Human exposure scenarios considered include normal releases (including leaching and operational spillage), human intrusion, and site farming or reclamation. Pathways and processes of transit from the trench to an individual or population includes ground water transport overland flow, erosion, surface water dilution, resuspension, atmospheric transport, deposition, inhalation, and ingestion of contaminated beef, milk, crops, and water. Both population doses and individual doses are calculated as well as doses to the intruder and farmer. Cumulative health effects in terms of deaths from cancer are calculated for the population over the 1000 y period using a life table approach. Data bases for three shallow land burial sites (Barnwell, South Carolina, Beatty, Nevada, and West Valley, New York) are under development. The interim model, includes coding for environmental transport through air, surface water, and ground water. DOE

N82-34215# Cincinnati Univ., Ohio.
INELASTIC STRONG INTERACTIONS AT HIGH ENERGIES Annual Progress Report, 1 Jun. 1981 - 1 May 1982
Peter Suranyi Jan. 1982 7 p refs
(Contract DE-AS02-76ER-02978)
(DE82-007984; DOE/ER-02978/7) Avail: NTIS HC A02/MF A01

A method for constructing quarks and leptons from more elementary constituents having only Abelian symmetries was introduced. Seven elementary constituents imply four generations of the known quarks and leptons. All conformally invariant actions for SU(N) extended supergravity theories in superspace were written down in terms of seven basic structures. A new conformal geometry with linear gauge symmetry was found to define two natural scales by its breakdown, one of which is the Planck length and the other may be identified with the grand unification scale. A modified perturbation expansion, convergent for arbitrary positive coupling constant was introduced for the one and two matrix models, related to the lattice versions of nonabelian gauge theories. An exactly soluble finite model for the renormalization group on quantum lattices was introduced. The critical properties of the model are similar to those of the infinite system, but the renormalization group transformations are singular in a large domain of the coupling parameters. DOE

N82-34216# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.
SPENT FUEL DRY STORAGE TECHNOLOGY DEVELOPMENT: ELECTRICALLY HEATED DRYWELL STORAGE TEST (3KW OPERATION)
R. Unterzuber and J. P. Hanson Sep. 1981 99 p refs
(Contract DE-AC08-81NV-10171)
(DE82-012567; DOE/NV-10171/1) Avail: NTIS HC A05/MF A01

An electrically heated drywell storage cell test has been in operation since March 1978 at the Engine-Maintenance, Assembly and Disassembly (E-MAD) facility on the Nevada Test Site in support of spent fuel dry storage technology development. The test data obtained at electric heater power output of 3.0 kW is given and the data is compared with that for heater power outputs of 1.0 kW and 2.0 kW. The simulated drywell storage cell consists of a stainless steel canister (representative of the spent fuel canisters being tested at E-MAD) containing an electrical heater assembly, a concrete-filled shield plug to which the canister is attached, and a carbon steel linear that encloses the canister and shield plug. The entire test drywell is grouted into a hole drilled in the soil adjacent to E-MAD. Temperature instrumentation is provided on the exterior of the canister and liner, in the grout around the liner, and at six radial locations in the soil surrounding the drywell. Peak measured canister and liner temperatures are 7850 F and 7470 F, respectively. DOE

N82-34217# Sandia Labs., Albuquerque, N. Mex. Fluid Mechanics and Heat Transfer Div.
THREE-DIMENSIONAL THERMAL ANALYSIS FOR A CONCEPTUAL HIGH-LEVEL WASTE REPOSITORY IN WELDED TUFF
Wayne D. Sundberg and Roger R. Eaton Apr. 1982 29 p
(Contract DE-AC04-76DP-00789)
(DE82-015503; SAND-81-0215) Avail: NTIS HC A03/MF A01

A near-field, three dimensional, thermal-conduction analysis was done for 2.16 kW high level waste canisters emplaced in welded tuff. Initial thermal loadings of 75 and 100 KW/acre were investigated. The conductivities used were 2.4 W/M.0C for the saturated tuff and 1.55 W/M.0C for the dry tuff. The tuff was modeled as always saturated and with boiling of the interstitial water. Calculations were done with the ADINAT finite-element code and associated pre- and post processor codes. For the 100-kW/acre initial loading, boiling of the interstitial water, and an initial temperature of 350 C, the maximum canister temperature was 2960 C. DOE

74 OPTICS

Includes light phenomena.

N82-34218# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
THE AEROSPACE LONG-PATH MULTIPLE REFLECTION CELL FACILITY
Kenneth C. Herr, Luis J. Ortega, Richard G. Robbins, Santo S. Durso, Robert M. Young, Don S. Urevig, and Carl J. Rice 30 Aug. 1982 22 p refs
(Contract F04701-81-C-0082)
(SD-TR-82-60; TR-0082(2940-03)-1) Avail: NTIS HC A02/MF A01

Aerospace long-path infrared absorption cell is described. This facility is a multiple-pass modified White cell which can be operated at any temperature between 170 K and room temperature with path lengths from 60 m up to 4 km. The cell itself is an 11-m

long double-walled aluminum dewar. The spectral coverage extends from visible to 50 microns using as a source either a high temperature black body or a tunable diode laser. An internal 20 kV flash photolysis system permits detection and kinetic studies of transient species. This combination of characteristics makes the system ideally suited to study a wide variety of upper and lower atmospheric phenomena under realistic conditions as well as other phenomena requiring low concentrations or high sensitivity. M.G.

N82-34219# Naval Ocean Systems Center, San Diego, Calif.
A COMMUNICATIONS OPTICAL PROCESSING TECHNIQUE Final Report, Jun. 1980 - Jun. 1981
Jerome J. Symanski, Richard H. Patterson, Richard D. Martin, and Keith Bromley Griffiss AFB, N.Y. RADC Mar. 1982 73 p refs
(AF Proj. 7055)
(AD-A116047; RADC-TR-82-57) Avail: NTIS HC A04/MF A01 CSCL 20/6

This report describes the development and test of an incoherent electro-optical processor. This processor was developed to demonstrate the utility of this device as an incoherent E-O processor, as a high speed, high resolution discrete Fourier transform device. The processor is being developed to analyze multiple communication channels simultaneously. Author (GRA)

N82-34220# Epsilon Labs., Bedford, Mass.
MULTICHANNEL VUV ROCKETBORNE MONOCHROMATOR FOR LOW-LEVEL AURORAL MEASUREMENTS Final Report, 14 Feb. 1979 - 1 Mar. 1981
Henry A. Miranda, Jr. Hanscom AFB, Mass. AFGL Mar. 1982 23 p refs
(Contract F19628-79-C-0019; AF Proj. 6609)
(AD-A115815; AFGL-TR-82-0103) Avail: NTIS HC A02/MF A01 CSCL 20/6

A multichannel photon counting VUV monochromator is described whose design features high sensitivity, rugged construction within about a 2/3 cu ft volume, and low crosstalk. Discussed also are the details of a careful calibration, as well as the results of a very preliminary analysis of data collected on a rocket flight into an aurora in March of 1981. It is concluded that the basic design of the instrument is valid. In addition, arguments are advanced to support the view that, in spite of the unfortunate use of a high-scattering grating, valid auroral emission rate data may have been collected in the 1325 A, 1356 A and 1384 A channels. Author (GRA)

N82-34221# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
TIME-FREQUENCY AND SPACE-FREQUENCY CHARACTERISTICS OF OPTICAL MODULATORS
L. Z. Kriksunov, V. I. Mekhryakov, and O. I. Naygovzin 20 May 1982 135 p refs Transl. into ENGLISH of the mono. "Chastotno-Vremennyye Prostranstvenno-Chastotnyye Kharakteristiki Opticheskikh Moduliruyushchikh Ustroystv" Moscow, Mashinostr., 1972 131 p
(AD-A115650; FTD-ID(RS)T-1209-81) Avail: NTIS HC A07/MF A01 CSCL 17/5

Frequency methods of analysis of modulators used in optical systems for determining the angular coordinates of moving objects and for automatic tracking are examined. The feasibility of modeling optical systems for determining the angular coordinates of moving objects by means of analog computers is demonstrated. A method is given for experimental determination of the spatial frequency responses of modulators. The method is based on the use of a laser. The results of experimental and theoretical studies are covered. L.F.M.

N82-34222# BDM Corp., Albuquerque, N. Mex.
AN EVALUATION OF THE RELATIVE PERFORMANCE OF THREE INFRARED IMAGERS THROUGH FOG Technical Progress Report, 25 Jan. - 1 Jun. 1982
E. H. Hackney 1 Jun. 1982 22 p refs
(Contract MDA903-81-C-0151; DARPA Order 4114)
(AD-A116893; BDM/A-82-276-TR) Avail: NTIS HC A02/MF A01 CSCL 17/5

Early in 1980, a field test of three thermal imaging sensors was performed. During these tests, a Honeywell scanning imager in the 8-12 micrometers band demonstrated superior performance at short range over the other sensors and Schottky barrier staring array sensor in the 3 micrometer band demonstrated superior performance at long range. Insufficient data was available for a complete evaluation; however, a qualitative analysis was performed. Author (GRA)

N82-34223# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.
CALCULATION ON OPTICAL EFFECT OF MATTER FROM FIRST PRINCIPLES USING GROUP THEORETICAL TECHNIQUES
Orazio I. Sindoni 18 Jun. 1982 14 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117310) Avail: NTIS HC A02/MF A01 CSCL 12/1

Scattering of light by molecules is commonly dealt with through Rayleigh-Debye theory. Such approach is known to be applicable to molecules whose effective index of refraction is close to unity and to imply a number of approximations which may have rather severe effects. In this paper we face the problem by adapting the method devised by Johnson, and successfully used to calculate the electronic states of large molecules, to the scattering of electromagnetic waves. Accordingly, we model a molecule as a cluster of spherical scatterers, possibly of different radii and refractive indexes. A plane electromagnetic wave, incident to the cluster, undergoes multiple scatterings which we account for by expanding the scattered wave in a multicentered series of vector harmonics. The expansion coefficients turn out to be the solutions of the system of linear equations obtained by expanding both the incident field and the within the spheres in a series of vector harmonics, and imposing the boundary conditions across the surface. Due to the presence of the incident plane wave, the above system is nonhomogeneous. GRA

N82-34224# Army Communications-Electronics Command, Fort Monmouth, N.J.
FLUOROPOLYMER BARRIERS TO STRESS CORROSION IN OPTICAL FIBERS
Liliana Klinger and James R. Griffith (NRL, Washington, D.C.) 18 Jun. 1982 12 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117346) Avail: NTIS HC A02/MF A01 CSCL 11/5

Organic polymer coatings play a critical role in determining the overall performance of optical fibers. They protect the very fine silica glass core from abrasive damage and environmental effects such as stress induced corrosion. In addition they act as a buffer in reducing the sensitivity of the optical fiber to microbending loss. In designing a coating system for optical fibers it is necessary to strike a balance between two factors: a soft compliant enclosure that acts as a buffer in masking the nonuniform surface of the glass and a hard enclosure to act as a stiffener and make the fiber resistant to the environmental surface. These requirements are best suited by using a photocured polyfluoropolyolacrylate of reduced crosslink density as a primary coating and the high modulus fluoroepoxy resin as a secondary coating. Although it is possible to lower the glass transition and modulus of the fluoroepoxy system, the longer cure times required for heat curing systems, make them less attractive as a primary coating. Also the superior surface properties of the fluoroepoxy suggest themselves for use as an external coating. GRA

N82-34225# Army Missile Command, Redstone Arsenal, Ala. Research Directorate.
PHOTONIC SEEKER DEVELOPMENT
Joseph G. Duthie, Paul R. Ashley (ERIM), Juris Upatnieks (Alabama Univ., Tuscaloosa), and H. K. Liu 18 Jun. 1982 11 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117160) Avail: NTIS HC A02/MF A01 CSCL 17/8

Experiments have been performed which indicate a means to extend significantly the number of matched filters which can be

simultaneously addressed in the photonic correlator. Results indicate that a total of 200 independent images of the target can be interrogated in parallel. This corresponds to an effective computation of over 10 to the 13th power complex multiplications per second. The suggested method is mechanically simple, optically easy to implement, requires little power and can be fabricated into a compact unit. Improvement in the signal to noise of a photonic correlator can be achieved by using an achromatic transform system and a thermal light source. At this time, however, the throughput of such a system is not sufficient to make a practical device. Whereas, efforts should continue to develop techniques to correlate using thermal light sources, the principal thrust for making a field operational system should, at this time, be concentrated on the use of laser diode sources together with the use of phase screens to extend the memory of these systems. GRA

N82-34226# ITT Electro-Optical Products Div., Roanoke, Va.
OPTICAL ROTARY JOINT Final Report, Sep. 1981 - May 1982
R. G. May, Jr. 18 Jun. 1982 49 p
(Contract N00014-81-C-2624)
(AD-A117025; ITT-82-24-02) Avail: NTIS HC A03/MF A01 CSCL 20/6

The primary objective of this contract is the design, fabrication, and testing of an optical rotary joint which permits transmission of signals through optical fibers across the interface of two environments rotating relative to each other. Outstanding optical performance is achieved through the use of gradient index lenses to couple radiation across the separation between two fibers. The salient features of this device are bidirectional operation at two wavelengths (850 nm and 1300 nm), low insertion loss, low rotationally induced variation of attenuation, a seven-circuit electrical slip-ring assembly, and rugged construction. The device is designed to facilitate the application of future designs to pressurized, subsea environments. Author (GRA)

N82-34227# Army Materials and Mechanics Research Center, Watertown, Mass.
ATTENUATION OF HIGH INTENSITY RERADIATED LIGHT BY PHOTOCHROMIC GLASS
Thomas V. Hynes 18 Jun. 1982 5 p refs Presented at the Proc. of the Army Sci. Conf., Watertown, Mass., 15-18 Jun. 1982
(AD-A117424) Avail: NTIS HC A02/MF A01 CSCL 20/6

One possible threat mechanism by which High Energy Laser Weapons may exploit the vulnerability of U.S. Army systems is through the production of large fluences of reradiated visible light when glass surfaces such as windscreens, vision blocks or lenses are struck by pulsed or CW laser radiation. At 10.6 meter laser wave lengths silicate glasses have very shallow absorption depths and, hence, heat to incandescence rapidly. Such blackbody surfaces at temperatures of 3000 (C+) will reradiate strongly in the visible region of the spectrum. In addition, if pulsed laser conditions are such that air plasmas are formed on the target, blackbody temperatures of 17,000 C may be obtained. This paper does not attempt to address flashblindness conditions; rather it focuses on the enhanced attenuation of the visible light in the optical materials behind the target surface. This paper reports a set of experiments to test the concept of the photochromic glass response as countermeasure against the visible reradiation obtained when transparent materials are irradiated by high energy lasers. In all of the experiments, a fused silica face plate (chose because of ultraviolet (UV) transparency) was the target and a laminate of four layers of the photochromic glass was placed behind the fused silica. Attenuation of visible light traversing the photochromic glass was measured. GRA

N82-34228# Army Armament Research and Development Command, Dover, N. J.
THE SHOCK FRONT RISE TIME IN WATER
Paul Harris and Henri-Noel Presles (Pottiers Univ.) 18 Jun. 1982 13 p refs Presented at 1982 Army Sci. Conf., 15-18 Jun. 1982
(AD-A117426) Avail: NTIS HC A02/MF A01 CSCL 20/14

This paper reports on successful shock front optical reflectivity theory and experiment for water at 5.8 kbar (0.58 GPa), and complimentary shock induced electrical polarization experiment and theory for the pressure range 20 kbar to 100 kbar. The LCWSL Universite de Poitiers program has experiments performed in France (funded by the Commission Nationale Recherche Scientique), while the ILIR program within the LCWSL funds the theoretical work. The consistent interpretation of the reflectivity and shock polarization results is (a) a shock front rise time of approximately 10-12 sec throughout the pressure range of 0 to 100 kbar, (b) a transition in the source of the dominant polarization voltage to the alignment of unbonded dipole moments at approximately 35 kbar, and (c) in the unbonded region the average contributing dipole is perfectly aligned in the direction of shock propagation. GRA

N82-34229# Naval Research Lab., Washington, D. C. Underwater Sound Reference Detachment.
A SYNCHRONOUS PHASE DETECTION SYSTEM FOR AN OPTICAL INTERFEROMETRIC SENSOR Interim Report
I. J. Bush 15 May 1982 78 p refs
(RF11125800)
(AD-A117435; NRL-MR-4808) Avail: NTIS HC A05/MF A01 CSCL 20/6

A system has been developed to accurately detect phase produced in optical interferometric sensors. The system employs optical heterodyning, and it synchronously detects optical phase by feeding an error signal back to a phase modulator in the reference leg of the interferometer. This system is seen to have properties similar to a phase-locked loop used for the demodulation of FM signals. The system model is second order and nonlinear, but a linear approximation serves to accurately describe the system in synchronous operation and is corroborated with well-matched empirical data. The complete model is simulated via computer techniques and is needed to describe the system's parameters that lead to loss and reacquisition of synchronization. GRA

N82-34230# Coast Guard Research and Development Center, Groton, Conn.
PRELIMINARY ASSESSMENT OF US COAST GUARD SHORT RANGE RECOVERY (SRR) FORWARD LOOKING INFRARED (FLIR) SYSTEM SMALL TARGET DETECTION PERFORMANCE Interim Report, Sep. 1981 - May 1982
S. R. Osmer, L. Nash, G. L. Hover, and T. J. Mazour May 1982 75 p refs Prepared in cooperation with Analysis and Technology, Inc., North Stonington, Conn.
(Contract DOT-CG-39-81-C-80287)
(AD-A117916; USCG-D-20-82; CGR/DC-6/82) Avail: NTIS HC A04/MF A01 CSCL 17/5

Forward Looking Infrared (FLIR) detection data have been collected in a dedicated electronic detection experiment conducted in 1981 by the U.S.C.G. Research and Development Center. This experiment was part of a series designed to improve search planning guidance contained in the National Search and Rescue Manual. An HH-52A helicopter equipped with a prototype Northrop Corp. SeeHawk FLIR system conducted detection runs with 15- to 19-foot fiberglass boats, 4- and 7-man life rafts, and simulated person-in-water (PIW) targets. The tests were conducted in Block Island Sound during September through November 1981. GRA

N82-34231# Boeing Aerospace Co., Seattle, Wash. Engineering Technology Div.
DEVELOPMENT AND TEST OF A DIGITAL/OPTICAL LINEAR POSITION TRANSDUCER Final Report, Aug. 1980 - Feb.1982
G. E. Miller, T. A. Lindsay, B. E. Johnson, and J. M. Ewing Jun. 1982 199 p refs
(Contract DAAK51-80-C-0028; DA Proj. 1L2-63211-D-315)
(AD-A117918; USAAVRADCOM-TR-82-D-6) Avail: NTIS HC A09/MF A01 CSCL 20/6

This report covers the design, development, fabrication, and testing of an optically analog linear position transducer with a full-scale displacement of 6 inches and an equivalent resolution of twelve bits. The transducer is electrically passive and interfaces

with the associated Electronic Interface Unit through fiber optics only. The EIU provides the necessary analog-to-digital conversion. The transducer was tested both functionally and environmentally.
Author (GRA)

N82-34232# BDM Corp., Monterey, Calif.
FACTORS RELATING SURFACE VISIBILITY TO THE TOTAL OPTICAL DEPTH IN THE MARINE REGIME Contractor Progress Report, 15 Apr. - 30 Sep. 1982
C. W. Fairall Monterey, Calif. NSP May 1982 31 p refs
(Contract N00014-82-C-0251)
(AD-A117836; NPS63-82-004CR) Avail: NTIS HC A03/MF A01 CSCL 20/6

This report describes same preliminary results of an effort to relate total aerosol optical depth at visible wavelengths to the visibility in the marine boundary layer (MBL). We present an atmospheric model which explains the observed height dependence of the aerosol extinction, examine aircraft and ship data from the MAGAT experiment, illustrate the influence of synoptic scale weather patterns on aerosol structure and present a simple model to relate alpha to total vertical depth. The ultimate goal of the project is to allow an estimation of IR ranges (due primarily to atmospheric water vapor density, Q) from satellite remote sensing data. A feasibility study on the concept was performed on two NPS data sets. Author (GRA)

N82-34233# Arizona Univ., Tucson. Digital Image Analysis Lab.
OPTICAL COMPUTATIONS FOR IMAGE BANDWIDTH COMPRESSION Final Report, 15 Mar. 1981 - 14 Mar. 1982
B. R. Hunt and R. Schowengerdt 15 May 1982 138 p refs
(Grant AF-AFOSR-0170-81; AF Proj. 2305)
(AD-A117722; DIAL/EE-81-005; AFOSR-82-0580TR) Avail: NTIS HC A07/MF A01 CSCL 09/2

This report summarizes the previous year's research in optical processing and optical/digital processing methods for image data compression. The following topics are discussed: (1) Radiometric and spatial transformations to achieve adaptive image data compression; (2) Spatial optical subsampling and spectral/spatial reconstruction for image data compression; and (3) Temporal interframe data compression. Author (GRA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-34234# Nagoya Univ. (Japan). Inst. of Plasma Physics.
DESORPTION AND RELATED PHENOMENA RELEVANT TO FUSION DEVICES
Atsushi Koma, ed. Apr. 1982 166 p refs
(IPPJ-AM-22) Avail: NTIS HC A08/MF A01

Desorption and related phenomena involved in the plasma wall interactions in fusion devices are briefly reviewed. Ion induced desorption, electron stimulated desorption, photodesorption, ion induced reemission of H, D and He atoms, chemisorption on carbide surfaces, and theory of desorption are discussed. S.L.

N82-34235# Nagoya Univ. (Japan). Inst. of Plasma Physics.
AN ANALYSIS OF CURRENT DRIVE BY TRAVELLING WAVE BASED ON THEORY OF INTRINSIC STOCHASTICITY
Akihiko Murakami and Yukio Midzuno Apr. 1982 32 p refs
(IPPJ-575) Avail: NTIS HC A03/MF A01

The mechanism of the current generation in a collisionless plasma by a train of travelling mirrors with modulated phase velocity is studied based on the theory of intrinsic stochasticity. It is shown that, if the phase modulation is small, the main contribution to the current generation comes from the phase mixing of the trajectories of trapped electrons in each Fourier component of a driving wave. For the case of a moderate phase modulation, however, formation of a large stochastic region due to the overlapping of primary resonances is very effective for increasing the generated current. Large phase modulation has little advantage in the current generation because the stochastic regions are formed at random in the phase plane. The results of analytical evaluation based on the above theory agree quite well with results of numerical experiments. M.G.

N82-34236# Nagoya Univ. (Japan). Inst. of Plasma Physics.
DETERMINATION OF METASTABLE FRACTION IN AN ION BEAM EXTRACTED FROM ECR PLASMA
Atsushi Matsumoto, Shunsuke Ohtani, and Tsuruji Iwai (Kansai Medical Univ., Osaka) Apr. 1982 30 p refs Sponsored by Ministry of Education
(IPPJ-580) Avail: NTIS HC A03/MF A01

The fraction of metastable state Ar(2+) [3p(4) (1)D] ions in Ar(2+) beam was determined by an optical attenuation method (OAM) combined with the conventional beam attenuation method. The present OAM is based on observation of spatial decay of specified emission line intensities arising from charge changed ions, along the beam axis in a target gas cell. The validity of the OAM is discussed in detail. The cross sections for one electron capture by the ground state Ar(2+)(3p) ions, sigma sub 21' were measured independently by the OAM. Both the cross sections are of the order of 10 to the -14th power cm and sigma sub 21 is about 1.3 times as large as sigma sub 21 at the collision energy of 1.5 keV. M.G.

N82-34237# Nagoya Univ. (Japan). Inst. of Plasma Physics.
FORMATION OF RELATIVISTIC ELECTRON BEAM RINGS IN A CONDUCTING CAVITY
Akihiro Mohri, Yukihiro Tomita, Mitsuru Hasegawa, Shinichi Miyake, Kazumichi Narihara, Tetsuya Tsuzuki, and Kenichiro Ukegawa May 1982 10 p refs
(IPPJ-583) Avail: NTIS HC A02/MF A01

An experiment is described which demonstrates that a relativistic electron beam ring of spheromak configuration is formed and stably kept in a conducting cavity of rectangular cross section without any help of external magnetic field for equilibrium. A rotating electron beam was injected through a hole of the cavity. Author

N82-34238# Nagoya Univ. (Japan). Inst. of Plasma Physics.
FORMATION OF MAGNETIC ISLANDS AND ERGODIC MAGNETIC LAYERS IN WALL-LAPPING PLASMA AS A NON-DIVERTOR CONCEPT FOR A REACTOR-RELEVANT TOKAMAK
T. Kawamura, Y. Abe, and T. Tazima May 1982 21 p refs
(IPPJ-587) Avail: NTIS HC A02/MF A01

The formation of resonant islands and the ergodization of magnetic field lines in the Tokamak boundary due to the subsidiary helical coils are numerically analyzed for the wall-lapping plasma concept as a nondivertor scenario for a reactor-relevant Tokamak. The parameters are taken referring to the R-Tokamak, a reacting plasma project. It was verified that this concept could be realized using the rotating islands by three sets of helical coils carrying alternating currents with shifted phases. It is also shown that this is possible by the local helical coils which span limited toroidal regions of the torus. M.G.

N82-34239# Nagoya Univ. (Japan). Inst. of Plasma Physics.
PROBE MEASUREMENTS FOR IMPURITY TRANSPORT IN THE SCRAPE-OFF LAYER OF JIPP T-II
M. Mohri, T. Satake, H. Hashiba, T. Yamashina, S. Amemiya, N. Noda, K. Kawahata, S. Tanahashi, and J. Fujita May 1982 23 p refs
(IPPJ-590) Avail: NTIS HC A02/MF A01

Impurity transport processes in the scrape-off layer of the JIPP T- 2 device were studied by a probe method. A cubical silicon probe was inserted and exposed to 20 identical Tokamak discharges in the scrape-off region. Deposited impurities were analyzed with use of AES, RBS and PIXE equipment. The main metallic impurities were molybdenum and iron whose deposition behavior was almost the same on any side of the probe, and their fluxes were observed to be 1.2 x 10 to the 13th power/sq cm discharge on the electron drift side and 5.2 x 10 to the 13th power/sq cm discharge on the ion drift side, respectively at the

distance of 18.3 cm from the center line of the plasma. The mean transport energy of the impurities striking the probe surface was estimated from the depth concentration profile applying the LSS theory for iron as 90 eV on the electron drift side and 250 eV on the ion drift side, respectively. The e-folding length of the scrape-off plasma density was measured by the radial distribution of a deposited tantalum amount to be 0.64 cm on the electron drift side and 1.73 cm on the ion drift side, respectively. Author

N82-34240# Nagoya Univ. (Japan). Inst. of Plasma Physics.
SIMPLE METHOD OF SHEET PLASMA PRODUCTION FOR HIGH CURRENT NEGATIVE ION II (CURVED SHEET PLASMA)
Joshin Uramoto Jun. 1982 17 p refs
(IPPJ-597) Avail: NTIS HC A02/MF A01

Sheet plasmas with various curvatures can be produced by arranging two different forms of rectangular permanent magnets on both sides of a cylindrical plasma column along a magnetic field. The sheet plasmas are very useful for focusing negative ion beams produced by surface conversion, which are called 'Yatsuhashi' (curved cracknel) plasma. Author

N82-34241# Nagoya Univ. (Japan). Inst. of Plasma Physics.
ALL COATED LIMITED EXPERIMENT IN THE JIPP T-II TOKAMAK
Y. Gomay, K. Kawahata, N. Noda, and S. Tanahashi Jun. 1982 19 p refs
(IPPJ-593) Avail: NTIS HC A02/MF A01

All the aperture limiters in JIPP T-II were changed to be TiC coated graphite. The maximum density in this condition is 7.6 x 10 to the 13th power/cu cm with the safety factor of 4.5, which is 2.7 times as high as the value obtained by the Murakami scaling. The Z(eff) values with this density and with a medium density of 2.4 x 10 to the 13th power/cu cm density are both close to unity after discharge cleaning for only three days. The behavior of limiter material release was found to be steady within a factor of two during the discharge, suggesting that the release mechanism is ion sputtering. Residual gas analysis also suggested that this sputtering is not chemical, which may be partly because the limiter surface temperature during the discharge is below 150 C. Author

N82-34242# Nagoya Univ. (Japan). Inst. of Plasma Physics.
WALL MATERIAL CHARACTERISTICS IN REACTING PLASMA MODELLING
T. Kawamura, K. Akaishi, and A. Miyahara Jun. 1982 17 p refs
(IPPJ-592) Avail: NTIS HC A02/MF A01

Using the one dimensional diffusion equation for impurities and energy balance equation for ions and electrons in the steady state Tokamak plasma, the self-consistent solutions of the impurity density profile and the temperature profile for a reacting DT plasma are analyzed, by taking into account of the plasma-surface interaction. On the bais of these results the influences of the impurities originated from the wall on the central plasma conditions and the Q-value of a reacting plasma are discussed. Author

N82-34243# Nagoya Univ. (Japan). Inst. of Plasma Physics.
HELICAL MAGNETIC CONFIGURATIONS PRODUCED WITH THE HELP OF FERROMAGNETIC MATERIALS. 2: THE HELIMAG
K. Ikuta May 1982 18 p refs
(IPPJ-591) Avail: NTIS HC A02/MF A01

A method of generating a helical magnetic configuration using a helical electro-magneto is established. It is suggested that this method might open the way for constructing large stellarators using circular planar coils and an electro-magneto for helical field. Since the rotational transform generated by this method is free from the deformation factor of the shaped ferromagnetic wall, the rotational transform is controllable by changing currents in the magnetization coils of a helical electro-magneto, although this control was impossible in the case of the ferromak. The application of this method to the modular stellarators is also discussed. M.G.

N82-34244# Nagoya Univ. (Japan). Inst. of Plasma Physics.
LAX-PAIR OPERATORS FOR SQUARED EIGENFUNCTIONS IN THE INVERSE SCATTERING TRANSFORMATIONS
Kazu-hiro Iino and Yoshi-Hiko Ichikawa May 1982 22 p refs
(IPPJ-589) Avail: NTIS HC A02/MF A01

Alternative Lax-pair operators are constructed for the Korteweg-de Vries equation and the modified Korteweg-de Vries equation using a modification of the algorithm of Chen, Lee, and Liu. These Lax-pair operators stand as the Lax-pair operators for the squared eigenfunction and the sum of squared eigenfunctions of the Ablowitz-Kaup-Newell-Segur inverse scattering transformation for these celebrated nonlinear evolution equations. Author

N82-34245# Nagoya Univ. (Japan). Inst. of Plasma Physics.
SELF-CONSISTENT ANALYSIS OF COLLISIONAL LOSS IN A SPATIALLY VARYING MAGNETIC MIRROR
Kuni-Hiro Sato May 1982 47 p refs
(IPPJ-588) Avail: NTIS HC A03/MF A01

Expressions for the particle and energy loss fluxes of a plasma in a realistic mirror configuration are obtained using self consistent analytic solutions of a linearized Fokker-Planck equation for ions and electrons. A magnetic field variation along field lines is taken into account, and both interactions between ions and electrons and effects of the ambipolar potential are included in the analysis. The results show that a value of bar n tau sub n bar n = volume-averaged particle density, tau sub n = particle confinement time) decreases due to effects of the magnetic field variation by a factor of two as compared with the value for the magnetic square-well and the total energy confinement time is almost equal to the particle confinement time. M.G.

N82-34246# Nagoya Univ. (Japan). Inst. of Plasma Physics.
WALL CONDITIONING OF THE JIPP T-II TORUS BY ac DISCHARGE CLEANING
N. Noda, S. Tanahashi, K. Kawahata, Y. Kawasumi, S. Ishji, Y. Ishibe, K. Okazaki, H. Oyama, Y. Sakamoto, and K. Yano Jun. 1982 15 p refs Presented at the 5th Intern. Conf. on Plasma Surface Interactions, Gatlinburg, Tenn., May I982 Submitted for publication
(IPPJ-595) Avail: NTIS HC A02/MF A01

Optimization of discharge cleaning was studied by using 60 Hz ac and CW ECR discharges. Reduction rate of oxygen was investigated for variations of the wall temperature. it is confirmed that, below 300 C, the reduction rate increases as the wall temperature is raised. A simple model is proposed for cleaning process and H2O pressure is calculated as a function of plasma density on the basis of this model. By comparing the calculated results to an experimental observation, it is found that it is essential to raise the electron density of the discharge-cleaning plasma high enough that the dissociation-loss rate of H2O is as large as the sticking-loss rate in order to optimize the cleaning. M.G.

N82-34247# Nagoya Univ. (Japan). Inst. of Plasma Physics.
EVOLUTION OF RING CURRENT FORMED BY RELATIVISTIC ELECTRON BEAM INJECTION INTO A CHARGE BUT NOT CURRENT NEUTRALIZING PLASMA
Kazumichi Narihara Apr. 1982 21 p refs
(IPPJ-576) Avail: NTIS HC A02/MF A01

The time evolutions of the azimuthal momentum distribution of the axisymmetrically injected electrons and the resulting ring current are self consistently analyzed under the assumption that no return current is induced in the background plasma. It is shown that the ring current grows linearly with time for a characteristic time from the start of beam injection, and afterthere it tends to saturate at some level. The dependence of the time evolution of the ring current on the beam energy at injection and on the injection current is also obtained. Author

N82-34248# Nagoya Univ. (Japan). Inst. of Plasma Physics.
ALTERNATIVE REPRESENTATIONS OF THE INVERSE SCATTERING TRANSFORMATION FOR THE K-d V EQUATION AND THE MODIFIED K-d EQUATION
Kazu-Hiro Iino and Yoshi-Hiko Ichikawa May 1982 8 p refs
(IPPJ-581) Avail: NTIS HC A02/MF A01

An alternative representation of the inverse scattering trans-

formation was found accidentally for the Korteweg-de Vries equation. Transformation of the eigenfunction reduces this representation to the original scheme discovered by Gardner, Greene, Kruskal and Miura. A similar analysis for the modified Korteweg-de Vries equation leads to a new representation of the inverse scattering transformation. Author

N82-34249# Nagoya Univ. (Japan). Inst. of Plasma Physics.
TRANSPORT CODE STUDY OF ELECTRON CYCLOTRON HEATING IN TOKAMAKS
T. Shimozuma (Kyoto Univ.), S. Tanaka (Kyoto Univ.), T. Maekawa (Kyoto Univ.), M. Okamoto, T. Amano, Y. Terumichi (Kyoto Univ.), and K. Shimizu May 1982 39 p refs
(IPPJ-582) Avail: NTIS HC A03/MF A01

In order to realistically simulate the electron cyclotron heating (ECH) in Tokamak plasmas, a one dimensional Tokamak transport code is combined with the electron cyclotron wave ray tracing code. The absorbed wave energy by plasma due to cyclotron damping of the electromagnetic waves (both ordinary (O) and extraordinary (X) modes) is taken into account as the energy source of the electron energy balance equation and several rays having different incident positions and angles are calculated to model the finite width and divergence of the microwave beam. The calculation for the ECH experiment on ISX-B Tokamak is carried out by using the present code and a fairly good agreement is obtained between the two. The code is also applied to the experimental parameters for ECH on WT-2 Tokamak and some characteristics of ECH are examined. S.L.

N82-34250# Nagoya Univ. (Japan). Inst. of Plasma Physics.
HIGH ENERGY TAIL PRODUCTION BY HIGHER HARMONIC FREQUENCY UP TO 5 OMEGA CI
M. Ichimura, K. Adati, T. Aoki, S. Hidekuma, K. Hattori, S. Hiroe, T. Kawamoto, R. Kumazawa, Y. Okubo, and S. Okamura Apr. 1982 23 p refs
(AD-B067129; IPPJ-584) Avail: NTIS HC A02/MF A01 CSCL 20/9

Fast wave heating experiments with type 3 coils and a rotating type 3 coil are performance on RFC-XX device. The heating characteristics of type 3 coil are studied by the numerical calculation from a view-point of the loading resistance. In the experiment with type 3 coils, frequencies from 2.7 to 5.6 times omega sub CI are used and a high energy tail in the ion energy spectrum is well developed at frequencies of 3, 4 and 5 times omega sub CI. On the rotating type 3 coil, the high energy tail is formed in the same extent in both cases of the right hand and the left hand rotations. S.L.

N82-34251# Nagoya Univ. (Japan). Inst. of Plasma Physics.
INTERRELATION OF ALTERNATIVE SETS OF LAX-PAIRS FOR A GENERALIZED NONLINEAR SCHROEDINGER EQUATION
Kazu-Hiro Iino and Yoshi-Hiko Ichikawa May 1982 16 p refs
(IPPJ-585) Avail: NTIS HC A02/MF A01

A given nonlinear evolution equation is used in an operator equation, which stands as a compatibility condition for an eigenvalue problem with an isospectral operator L and a temporal evolution equation of its eigenfunction characterized by an operator A. A unified scheme of the inverse scattering transformation for several nonlinear evolution equations are presented. S.L.

N82-34252# Nagoya Univ. (Japan). Inst. of Plasma Physics.
AVERAGE BETA VALUE OF AXIALLY SYMMETRIC PLASMA
Shobu Kaneko and Katsuji Chiyoda May 1982 8 p refs
(IPPJ-586) Avail: NTIS HC A02/MF A01

A useful expression for an average beta value is derived by using the Grad-Shafranov equation. The plasma is assumed to be confined in a finite region and to be in an axially symmetric magnetohydrodynamic equilibrium. The magnetic flux function psi is assumed to vanish on the plasma surface. The average beta value <beta> is defined by 8 pi integral pdV/integral B(2)dV, where p is the kinetic pressure, B is the strength of the magnetic field, and the integrations are carried out over the whole plasma region. when p is proportional to psi (alpha) (alpha is a positive number) and the toroidal magnetic field is absent, the value of <beta> is shown to be 2/alpha. This value is independent of the shape of the plasma. M.G.

N82-34253# Tohoku Univ., Sendai (Japan). Dept. of Electrical Engineering.
PROPAGATION CHARACTERISTICS IN A MAGNETIZED PLASMA-WAVEGUIDE NEAR THE ION CYCLOTRON FREQUENCY
Toshiro Ohnuma and Tsuguhiro Watanabe (Hiroshima Univ.) Jun. 1982 13 p refs
(IPPJ-598) Avail: NTIS HC A02/MF A01

Propagation characteristics of electrostatic waves near an ion cyclotron frequency are investigated in a magnetized plasma waveguide. The dispersion curves and the damping factor near the fundamental and the second harmonic ion cyclotron frequency are studied for fixed perpendicular wave numbers. S.L.

N82-34254# Nagoya Univ. (Japan). Inst. of Plasma Physics.
A SCALING LAW OF NEUTRON YIELD FOR DT DISCHARGE IN PLASMA FOCUS
T. Kobata, I. Ueno, M. Tanimoto, and K. Ikuta Jul. 1982 11 p refs
(IPPJ-600) Avail: NTIS HC A02/MF A01

A scaling law of neutron yield for a D-T gas discharge in a plasma focus device is obtained. The resulting scaling law supports the feasibility of the D-T fusion reactor by the use of plasma focus, provided that the device is operated under a high voltage conditibn. Author

N82-34255# Nagoya Univ. (Japan). Inst. of Plasma Physics.
FORMATION OF Z-DISCHARGED PLASMA CHANNEL IN LIB-FUSION DEVICE
S. Kawata, K. Niu, and H. Murakami Jul. 1982 17 p refs
(IPPJ-601) Avail: NTIS HC A02/MF A01

The process of the formation of the plasma channel by z-discharge to transport the intense ion beam is made clear by computer simulation. A z-discharged current achieves 50 kA, which is strong enough to confine the beam in the channel. Two kinds of radial motion are induced in the channel; one is the inward pinch motion by the self-magnetic field and the other is the outward expanding motion accompanied by the shock wave. Author

N82-34256*# Middlebury Coll., Vt. Dept. of Physics.
STRUCTURE OF FIELD ROTATING DISTURBANCES IN WARM PLASMA Final Technical Report
Richard Wolfson 31 Aug. 1982 42 p refs Submitted for publication
(Grant NAGw-54)
(NASA-CR-169359; NAS 1.26:169359) Avail: NTIS HC A03/MF A01 CSCL 20I

A model in which thermal effects are simulated through use of a multibeam plasma distribution function is developed and investigated to see if solutions which take an initially uniform magnetized plasma to a new uniform state with different field orientation are possible. The momentum conservation integrals are found to admit two classes of such solutions, but only one class exhibits appropriate asymptotic behavior. Extensive numerical integrations have failed to demonstrate the existence of the desired solutions. Author

N82-34257# Colorado Univ., Boulder.
PLASMA WAVE TURBULENCE AND PARTICLE HEATING CAUSED BY ELECTRON BEAMS, RADIATION AND PINCHES Interim Report, 1 Oct. 1980 - 30 Sep. 1981
Martin V. Goldman May 1982 272 p refs
(Grant AF-AFOSR-0022-80; AF Proj. 2301)
(AD-A117862; CU-1533143; AFOSR-82-0592TR) Avail: NTIS HC A12/MF A01 CSCL 20/9

This interim report covers research performed from October 1, 1980 through September 30, 1981 on electron-beam excited plasma turbulence and electromagnetic emission, on propagation of intense electromagnetic radiation in the Earth's ionosphere, on

plasma diagnostics, and on experiments to accelerate ions and excite low frequency turbulence in the laboratory. Author (GRA)

N82-34258# Naval Research Lab., Washington, D. C. Plasma Physics Div.
MICROWAVE ENERGY COUPLING IN A NITROGEN BREAKDOWN PLASMA Interim Report
C. L. Yee (Mission Research Corp.), A. W. Ali, and W. M. Bollen 10 Aug. 1982 23 p refs
(SF68344601)
(AD-A117900; NRL-MR-4869) Avail: NTIS HC A02/MF A01 CSCL 20/9

Computer simulations of microwave coupling to a nitrogen breakdown plasma have been performed at 25 Torr. Non-hydrodynamic ionization fronts are observed to propagate toward the radiation source under a variety of circumstances. Free nitrogen breakdown simulations in a spherical system show the propagation velocity of the breakdown wave can be as high as 5 x 10 to the 6th power cm/sec. An elementary theory is used for estimating the speed of the breakdown wave in one dimension. The results are in reasonable agreement with breakdown experiments. Author (GRA)

N82-34259# Missouri Univ., Rolla. Dept. of Electrical Engineering.
RESEARCH SUPPORT FOR PLASMA DIAGNOSTICS ON ELMO BUMPY DIAMAGNETIC MEASUREMENTS FOR THE ELECTRON RINGS AND DEVELOPMENT OF A FERROMAGNETIC RESONANCE MAGNETOMETER Final Report, 1 Feb. - 30 Sep. 1981
Kenneth H. Carpenter and Marcus K. daSilva Oct. 1981 84 p refs
(Contract W-7405-eng-26)
(DE82-007245; ORNL/Sub-7676/2) Avail: NTIS HC A05/MF A01

The bumpy cylinder MHD equilibrium code which was compared to the concentric current sheet model for the EBT electron rings in a previous report was subjected to additional numerical tests which confirm the validity of the previous work. Further analysis of the current sheet model as a means of calibration of the EBT diamagnetic diagnostic for perpendicular energy shows the model's simplicity is not the limiting factor in accuracy of the calibration. The fluctuations of the currents in the vacuum field coils were observed as voltage signals from the generator shunts. Significant low frequency components were observed that cannot be removed from diamagnetic signals by low pass filtering alone. A YIG magnetometer was developed and used to make test measurements of the diamagnetic field of the electron rings on EBT. The field values observed were on the order of 1 Gauss in a region where the vacuum field was about 600 Gauss. These values agree with the perpendicular energy diamagnetic flux diagnostic with reasonable assumptions for ring geometry. DOE

N82-34260# Department of Energy, Washington, D. C.
THE 1981 MAGNETIC-FUSION THEORY PROGRAM PROJECT SUMMARIES
Feb. 1982 134 p refs
(DE82-008102; DOE/ER-0119) Avail: NTIS HC A07/MF A01

Theoretical research into the behavior of magnetically confined plasmas in various geometries is summarized. This work ranges from empirically based modelling of particular devices to abstract analyses of the qualitative behavior of the equations which govern plasmas. The program is divided into six functional categories: Tokamak theory, mirror theory, alternate concepts theory, generic theory, atomic theory, and device modelling are discussed. The Branch also operates the MFE computer network. The status of the computer network is summarized. DOE

N82-34261# Pacific Northwest Lab., Richland, Wash.
DEVELOPMENT OF MATERIALS FOR OPEN CYCLE MHD Quarterly Report, period ending Mar. 1981
J. Lambert Bates and D. D. Marchant Jan. 1982 59 p refs
(Contract DE-AC06-76RL-01830)
(DE82-008777; PNL-4001-1) Avail: NTIS HC A04/MF A01

The development and fabrication of the HfO2-RE sub x/O sub Y electrodes and HfO2-RE sub x/o sub Y-In2O3 current leadouts for testing in MHD facilities is discussed. The electrical conductivity of some potential HfO2-RE sub x O sub Y refractory electrodes was measured and preliminary results analyzed in relationship to structure and composition. Six potential air preheater materials, tested in the Montana State University heat exchanger, were characterized and evaluated. The potential mechanisms for orrosion/erosion are discussed. Electrochemical corrosion of platinum in molten coal slag was also measured. Possible corrosion mechanisms are discussed. DOE

N82-34262# Texas Univ., Austin. Fusion Research Center.
THOMSON SCATTERING ON THE PRETEXT TOKAMAK Ph.D. Thesis
Steven C. McCool Mar. 1982 224 p refs
(Contract DE-AS05-77ET-53042)
(DE82-009085; DOE/ET-53042/35) Avail: NTIS HC A10/MF A01

Ruby laser Thomson scattering was performed on the PRETEXT Tokamak. A 10 Joule Q-switched laser and a 1 meter 10 channel polychromator were used to diagnose the electron temperature and density profiles in the PRETEXT plasma. These parameters were measured as a function of time and radial position on a shot to shot basis. The density measurement was calibrated by Rayleigh and Raman scattering and by comparison with data from a 4 mm microwave interferometer. Electron densities ranging from 1 x 10 to the 12th power cm(-3) to 2 x 10 to the 13th power cm(-3) and temperatures ranging from 3 eV to 400 eV were observed. Detailed measurements were made throughout the 40 ms discharge with particular emphasis on the current rise phase. The Thomson scattering data was used as input to a one dimensional magnetic diffusion code. This code modelled the evolution of the current density and safety factor profiles. The results of this analysis were compared with existing theories of Tokamak current penetration. The growth of resitive MHD tearing modes was proposed as a likely explanation for the anomalously rapid current penetration observed in PRETEXT. DOE

N82-34263# Wisconsin Univ., Madison. Dept. of Plasma Physics.
LOW-FREQUENCY TURBULENCE, PARTICLE AND HEAT TRANSPORT IN THE WISCONSIN LEVITATED OCTUPOLE Ph.D. Thesis
Harold Ray Garner Jan. 1982 145 p
(Contract DE-AS02-76ET-53051)
(DE82-012557; DOE/ET-53051/27) Avail: NTIS HC A07/MF A01

Low frequency turbulence in the drift frequency range and its relation to the observed particle transport in the Wisconsin levitated octupole was studied with a microwave scattering apparatus. The experimental parameters were T sub e approx. T sub i $<$ 30 eV, n $<$ 1.5 x 10 to the 13th power cm (-3), 200 G $<$ B sub (p - average) $<$ 1.25 kG. The effect of shear on the transport was studied by the addition of a small toroidal field. By matching experimentally measured density profiles to those given by numerical solutions of the transport equations, diffusion coefficients were obtained. Time dependent density fluctuation spectra were measured with an 8 mm microwave scattering diagnostic to correlate the drift wave portion of the spectrum with the observed diffusion. The density fluctuation spectrum of low frequency turbulence was measured for several values of the perpendicular wavenumber. Electron heat transport was studied by fitting experimentally measured electron temperature profiles to those predicted by numerical solutions of electron energy transport equation. DOE

N82-34264# Los Alamos Scientific Lab., N. Mex.
MODEL CALCULATIONS FOR THE EXPLOSIVE GENERATOR-DRIVEN DENSE PLASMA FOCUS
J. Brownell and R. Landshoff Feb. 1982 11 p refs
(Contract W-7405-eng-36)

(DE82-008960; LA-9040) Avail: NTIS HC A02/MF A01

A model developed to aid in the design and interpretation of explosive generator-driven dense plasma focus experiments is described. Several models were investigated, but the one presented here employs a plane sheath propagating along the barrel of a Mather-type gun, entraining a constant fraction of the swept up gas and carrying the return current between the electrodes. The motion of the sheath is determined from the momentum equation using the integrated magnetic force on the sheath. The solutions are obtained both numerically and by an approximate analytic procedure, and the performance of the system has been determined as a function of the switching time when the generator is connected to the dense plasma focus. DOE

N82-34265# Department of Energy, Washington, D. C. Office of Energy Research.

TOKAMAK CONFINEMENT EXPERIMENTS

Mar. 1982 64 p refs

(DE82-009301; DOE/ER-0122) Avail: NTIS HC A04/MF A01

There are currently five major US Tokamaks being operated and one being constructed under the auspices of the Division of Toroidal Confinement Systems. The currently operating Tokamaks include: Alcator C at the Massachusetts Institute of Technology, Doublet III at the General Atomic Company, the Impurity Studies Experiment (ISX-B) at the Oak Ridge National Laboratory, and the Princeton Large Torus (PLT) and the Poloidal Divertor Experiment (PDX) at Princeton Plasma Physics Laboratory. The Tokamak Fusion Test Reactor (TFTR) is under construction at Princeton and should be completed by December 1982. There is one major Tokamak being funded by the Division of Applied Plasma Physics. The Texas Experimental Tokamak (TEXT) is being operated as a user facility by the University of Texas. The TEXT facility includes complete set of standard diagnostics and a data acquisition system available to all users. DOE

N82-34266# Brookhaven National Lab., Upton, N. Y. Div. of Magnetic Fusion Energy.

BNL NEUTRAL-BEAM DEVELOPMENT GROUP Progress Report for FY 1981

K. Prelec and T. Sluyters 15 Jan. 1982 16 p refs

(Contract DE-AC02-76CH-00016)

(DE82-008852; BNL-51507) Avail: NTIS HC A02/MF A01

The Brookhaven High Energy Neutral Beam Development Group is developing injection systems, particularly for the next generation of fusion mirror and Tokamak experiments. These injectors are based on the acceleration and neutralization of negative deuterium ions, to utilize their high neutralization efficiency which is nearly independent of energy above 50 keV/nucleon. DOE

N82-34267# General Atomic Co., San Diego, Calif.

FUSION ENGINEERING DEVICE. VOLUME 1: MISSION AND PROGRAM SUMMARY

John R. Gilleland and John M. Rawls, ed. Oct. 1981 134 p refs 6 Vol.

(DE82-008931; DOE/TIC-11600-Vol-1) Avail: NTIS HC A07/MF A01

A Tokamak reactor core was chosen as the basis of the FED design by virtue of the superior containment and heating achieved in present generation devices, the vigorous ongoing Tokamak research program whose strengths can be brought to bear on the design issues facing FED, and the intrinsic potential of Tokamaks as commercial reactors. The FED concepts was formulated under the premise that it is essential for the device to be based on a confinement approach compatible with an attractive reactor embodiment. This premise is predicated on the perceived needs both to maximize the efficient utilization of limited program resources and to minimize the potential for distortion of program balance commonly associated with large construction projects. DOE

N82-34268# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

EFFECTS OF ION-BOUNCE RESONANCES ON BALLOONING-INTERCHANGE MODES

M. N. Rosenbluth, P. J. Catto, and X. S. Lee Apr. 1982 24 p refs

(Contract DE-AC03-76ET-53057)

(DE82-014405; SAI-254-82-114-LJ; PRI-41) Avail: NTIS HC A02/MF A01

In an axisymmetric device, an ion distribution function sharply peaked in pitch angle may be employed to obtain ballooning-interchange stability by optimizing the time these sloshing ions spend in regions of good curvature. However, the resulting magnetohydrodynamically stable modes can be driven unstable by the sloshing ion bounce motion resonating with the background wave. The stability conditions and growth rate for these sloshing ion bounce resonant modes are investigated and an example presented. DOE

N82-34269# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.

SUPPRESSION OF PLASMA FORMATION IN WAVEGUIDE ANTENNAS FOR LOWER-HYBRID HEATING

S. F. Knowlton, M. Porkolab, and S. C. Luckhardt Apr. 1982 7 p refs Presented at the 3rd Joint Varenna-Grenoble Intern. Symp. on Heating in Toroidal Plasmas, Grenoble, France, 22-27 Mar. 1982

(Contract DE-AC02-78ET-51013)

(DE82-014392; DOE/ET-51013/42; PFC/CP/82-6; CONF-820345-12) Avail: NTIS HC A02/MF A01

A magnetic field was applied to the 800 MHz four-waveguide lower hybrid heating grill on the Versator Tokamak to suppress plasma formation and RF breakdown in the evacuated waveguides during Tokamak operation. Without an auxiliary magnetic field, the incident power density is limited typically to 0.13 KW/sq cm. When the imposed magnetic field in the antenna is above the electron-cyclotron resonance value, the grill operates without RF breakdown or plasma formation at an incident power level of 0.42 KW/sq cm, limited only by the available RF power. A power density of 0.94 KW/sq cm was achieved when all the RF power was injected into one waveguide, again with no evidence of plasma formation. DOE

N82-34270# Columbia Univ., New York. Plasma Physics Lab.

MULTI-POINT THOMSON SCATTERING

F. M. Levinton and G. A. Navratil 1982 34 p refs

(Contract DE-AS02-76ET-53016)

(DE82-014385; DOE/ET-53016/77; Rept-86) Avail: NTIS HC A03/MF A01

A detector system for single shot measurement of electron temperature and density profiles in a magnetically confined plasma is described. Preliminary results were obtained with this multi-point Thomson scattering diagnostic on Torus II, a high beta Tokamak. It has a density range of 2 x 10 to the 13th power cm(-3) approximately < n sub 3 approximately < 5 x 10 to the 14th power cm(-3) in the preionization phase and density of 5 x 10 to the 14th power cm(-3) approximately < n sub e approximately < 2 x 10 to the 15th power cm(-3) in the Tokamak phase. Electron temperatures range from T sub e > 6 eV in the preionization phase to T sub e approx. 100 eV in the Tokamak phase. The detector used is a multi-anode microchannel plate (MCP) with a 25 mm diameter multi-alkali photocathode. A 10 x 10 array of anodes collect the current, which is amplified by as much as 1 million. Each anode is independent so the MCP can be viewed as a parallel array of 100 independent photomultiplier tubes. DOE

N82-34271# Oak Ridge National Lab., Tenn.

CALIBRATION OF A DIAMAGNETIC DIAGNOSTIC FOR STORED ENERGY OF HIGH-TEMPERATURE ELECTRON ANNULI IN ELMO BUMPY TORUS (EBT)

K. H. Carpenter, R. A. Dandl, and M. W. McGuffin May 1982 41 p refs

(Contract W-7405-eng-26)

(DE82-015235; ORNL/TM-7076) Avail: NTIS HC A03/MF A01

The perpendicular energy component of the stored energy of

the electron annuli in ELMO Bumpy Torus (EBT) can be observed with diamagnetic flux detecting coils. The calibration of the signal from the coils in terms of stored energy requires a model for the geometrical structure of the annulus. Using a model of concentric cylindrical current sheets, the calibration factor for the diamagnetic perpendicular energy signal is derived, including the effects of drift currents and coupling of flux from adjacent annuli. Numerical calculations show the calibration factor to be insensitive to reasonable variations in the model parameters. DOE

N82-34272# California Univ., Livermore. Lawrence Livermore Lab.
SUMMARY OF THOMSON-SCATTERING DATA FROM THE TANDEM MIRROR EXPERIMENT (TMX)
R. K. Goodman 11 Jan. 1982 23 p refs
(Contract W-7405-eng-48)
(DE82-014956; UCRL-53243) Avail: NTIS HC A02/MF A01

A synthesis of Thomson scattering measurements of electron temperature (T sub e) and density (n sub e) for the tandem mirror experiment (TMX) is presented. TMX operated in two modes: high and low T sub e c. When performing in the high T sub e mode (in general $>$ 100 eV), heating the central-cell ions with neutral beams raised T sub e in the end plug. A maximum T sub e of 260 eV was achieved in the east end plug. Specifically, the experiments demonstrated that in the end plug, the radial T sub e profiles were flat to r = 5 cm; the ratio of potential (phi sub p) to T sub e ranged between four and six. Although T sub e in the central cell was generally comparable to that in the plug, it was often not constant along a magnetic field line. Under some conditions a non-Maxwellian electron distribution may have been present. DOE

N82-34273# Los Alamos Scientific Lab., N. Mex.
SIMPLIFIED SCALING MODEL FOR THE THETA-PINCH
K. J. Ewing and D. B. Thomson Feb. 1982 46 p refs
(Contract W-7405-eng-36)
(DE82-009962; LA-9074-MS) Avail: NTIS HC A03/MF A01

A simple ID scaling model for the fast Theta pinch was developed and written as a code that would be flexible, inexpensive in computer time, and readily available for use with the Los Alamos explosive-driven high magnetic field program. The simplified model uses three successive separate stages: (1) a snowplow-like radial implosion, (2) an idealized resistive annihilation of reverse bias field, and (3) an adiabatic compression stage of a Beta = 1 plasma for which ideal pressure balance is assumed to hold. The code uses one adjustable fitting constant whose value was first determined by comparison with results from the Los Alamos Scylla III, Scyllacita, and Scylla IA Theta pinches. DOE

N82-34274# General Atomic Co., San Diego, Calif.
FUSION ENGINEERING DEVICE. VOLUME 3: TEST PLAN
John M. Rawls Oct. 1981 101 p Sponsored by DOE 6 Vol.
(DE82-008933; DOE/TIC-11600-Vol-3) Avail: NTIS HC A06/MF A01

The key objectives of the test plan and a timetable for meeting those objectives are presented. The operating history of the devices is regarded as consisting of a number of distinct stages for resolving the outstanding physics and engineering questions. These states are identified and related to the overall test plan. The demonstration of integrated machine operation, the production of sustained fusion energy, and the extraction of fusion power are of primary concern. The impact of the testing program on FED design and operation is described. DOE

N82-34275# General Atomic Co., San Diego, Calif.
FUSION ENGINEERING DEVICE. VOLUME 4: PHYSICS BASIS AND PHYSICS R AND D REQUIREMENTS
Oct. 1981 192 p refs Sponsored by DOE 6 Vol.
(DE82-008934; DOE/TIC-11600-Vol-4) Avail: NTIS HC A09/MF A01

The following issues are discussed: (1) confinement scaling; (2) cross section shaping, limits on B and q; (3) ion cyclotron heating; (4) neutral beam heating; (5) mechanical pump limiter; (6) poloidal divertor; and (7) non-divertor active impurity control. DOE

N82-34276# General Atomic Co., San Diego, Calif.
FUSION ENGINEERING DEVICE. VOLUME 5: TECHNOLOGY R AND D REQUIREMENTS FOR CONSTRUCTION
Oct. 1981 105 p Sponsored by DOE 6 Vol.
(DE82-008936; DOE/TIC-11600-Vol-5) Avail: NTIS HC A06/MF A01

The following areas are covered: (1) nuclear systems; (2) auxiliary heating; (3) magnet systems; (4) remote maintenance; (5) fueling; (6) diagnostics, instrumentation, information, and control; and (7) safety and environment. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N82-34277# Scientific Research Associates, Inc., Glastonbury, Conn.
THREE-DIMENSIONAL NUMERICAL STUDIES OF THE PHYSICS OF SEMICONDUCTOR CRYSTAL GROWTH Final Report, 1 Jan. - 30 Jun. 1982
N. S. Liu, S. J. Shamroth, and H. L. Grubin Jul. 1982 43 p refs
(Contract N00014-82-C-0140)
(AD-A116861; SRA-R82-920013-4) Avail: NTIS HC A03/MF A01 CSCL 20/12

The primary purpose of the Phase I study was to establish the feasibility of developing reliable theories with predictive capability in the area of crystal growth. Within the guidelines of the DESAT program the proposed study was limited to an area where some computational fluid dynamic studies have already appeared and where numerous experimental results have been reported; namely, the area of Czochralski crystal pulling. The intent of the study was to generalize all previously developed work, and to incorporate three-dimensional effects, which invariably arise when stirring is included. For Czochralski growth nonaxisymmetric effects were formulated and numerical simulations were performed for two cases: (1) a local hot spot on the crucible wall, and (2) angular misalignment between the crystal and crucible rotational axes. GRA

N82-34278# Naval Weapons Center, China Lake, Calif. Research Dept.
ULTRAVIOLET ENHANCED DEPOSITION FROM PENTACARBONYL-IRON ON GALLIUM ARSENIDE, QUARTZ, AND SAPPHIRE Summary Report, Jun. - Aug. 1981
N. Bottka and P. Walsh (Fairleigh Dickenson Univ.) Oct. 1981 49 p refs
(RR02102)
(AD-A116800; NWC-TP-6323) Avail: NTIS HC A03/MF A01 CSCL 20/12

This report assesses the potential utilization of organo-metals in the thin-film deposition of metals, semiconductors, and insulators onto various substrates. The emphasis is on the particular advantages of the ultraviolet photolysis of organometals using incoherent light for low temperature, wide-area deposition of thin films. Experimental results on the photolysis and pyrolysis of pentacarbonyl-iron on gallium arsenide, quartz, and sapphire are reported. Author (GRA)

N82-34279# Army Materials and Mechanics Research Center, Watertown, Mass.
RESOLUTION OF FACTORS RESPONSIBLE FOR DIFFICULTY IN GROWING SINGLE CRYSTALS OF YAG
Jaroslav Caslavsky and Dennis J. Viechnicki 18 Jun. 1982 8 p refs Presented at the Army Sci. Conf., Watertown, Mass., 15-18 Jun. 1982
(AD-A117401) Avail: NTIS HC A02/MF A01 CSCL 20/2

The enhanced formation of the scattering centers in Nd:YAG

is attributed to the fact that the melting point of YAG is 170 deg C lower than the melting point of NdA103. Further, since aluminium ions in the neodyium aluminate are present in six-fold coordination NdA103 can easily nucleate near the solid-liquide interface where lower temperature favors reaction (1). Provided that the growth rate of Nd:YAG exceeds the kinetics of reaction (2), the second phase particles will precipitate in the growing Nd:YAG crystal and appear as scattering centers. From the experimental evidence it can be concluded that in the composition section on and near the tie line connecting NdA103 and Y3A15012 in the Nd203-Y203-A1203 ternary system, NdA103 shows an inherent property to nucleate first. To eliminate the nucleation of Nd103 during the crystal growth of Nd:YAG the thermal gradient near the solid-liquid interface has to be very steep while the melt temperature has to be kept above the temperature which prevents reaction (1). Simultaneously the speed of the interface advancement has to be set below the thermally induced flow of the melt from the solid-liquid interface. Therefore, it is apparent that with the correct growth conditions scattering center free Nd:YAG single crystals can be grown by VSOM. Author (GRA)

N82-34280# Army Electronics Technology and Devices Lab., Fort Monmouth, N. J.

UTILIZATION OF QUANTUM DISTRIBUTION FUNCTIONS FOR ULTRA SUBMICRON DEVICE TRANSPORT

G. J. Iafrate 18 Jun. 1982 12 p refs Presented at 1982 Army Sci. Conf., 15-18 Jun. 1982

(AD-A117433) Avail: NTIS HC A02/MF A01 CSCL 20/12

This paper puts forth a formalism for treating ultra-submicron device transport. The formalism results in a useful and attractive methodology for describing quantum device transport in that the theory is derived from a fully quantum mechanical representation, yet implicitly contains elements of the semiclassical semiconductor transport picture. The basic three semiconductor quantum transport equations were derived using the Wigner distribution function. These transport equations were shown to contain explicit quantum corrections; these quantum corrections are non-negligible when the transit lengths of the semiconductor device are of the order of the carrier deBroglie wavelength. Since the carrier deBroglie wavelength for carriers is of the order of hundreds of angstroms in III-V device materials of interest to the Army, the quantum description of transport as described here will play a vital role in predicting the electrical behavior of present and future generation ultra-submicron devices. In future studies, theoretical efforts will be expanded to include device modeling of submicron and ultra-submicron semiconductor devices such as P-N junctions, planar doped barriers, and oneand two-dimensional superlattices; for these devices, it is clear that quantum transport will indeed be necessary to explain their semiconductor transport characteristics. GRA

N82-34281# Carnegie-Mellon Univ., Pittsburgh, Pa.

A PROGRAM OF RESEARCH ON MICROFABRICATION TECHNIQUES FOR VLSI MAGNETIC DEVICES Annual Interim Progress Report, 30 Sep. 1980 - 29 Sep. 1981

M. H. Kryder, C. L. Bauer, J. A. Rayne, and A. Guzman 1 Oct. 1981 277 p refs

(Grant AF-AFOSR-0284-80; AF Proj. 2305)

(AD-A117922; AFOSR-82-0610TR; AIPR-1) Avail: NTIS HC A13/MF A01 CSCL 20/12

Means of fabricating, selectively modifying, and characterizing single crystal epitaxial garnet and amorphous magnetic thin films are being investigated with the intention of developing new materials and processes for magnetic devices including bubble, recording, magneto-optic, and microwave devices. Techniques for the routine deposition of these materials have been established and several novel characterization techniques developed. Transmission electron microscopy has been used to investigate structural effects of ion implantation on garnet materials and selected area transmission electron diffraction has been used to study strain profiles at boundaries between implanted and unimplanted garnet material. A magneto-optic photometer system which permits characterization of thin (approx 1000A) layers of magnetic material with resolution on the order of a micrometer has been developed and used to magnetically characterize ion implanted layers of garnet. Optical spectra of ion implanted garnets are being studied to gain information on the stoichiometric and crystal field deviations produced by ion implantation in garnets. Amorphous magnetic materials are being researched in an attempt to replace the more expensive single crystal magnetic garnets. Furthermore, both contiguous-disk and current-access magnetic bubble devices have been fabricated and a novel current-access ion-implanted device demonstrated to require low power dissipation. Author (GRA)

N82-34282# Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.

GROWTH AND CHARACTERIZATION OF In(1-X)Ga(X) As(Y)P (1-Y) AND GaAs USING MOLECULAR BEAM EPITAXY Final Report, 9 Feb. 1979 - 30 Sep. 1981

G. D. Holah, E. L. Meeks, F. L. Eisele, and D. W. Covington Feb. 1982 85 p refs

(Contract N00173-79-C-2291)

(AD-A117507; GIT/EES-A-2291) Avail: NTIS HC A05/MF A01 CSCL 20/7

This report describes the technical accomplishments of a two-year basic research program directed towards a study of GaAs and the quaternary III-V alloy system, In(1-x)Ga(x)As(y)P(1-y), grown by molecular beam epitaxy (MBE). Layers suitable for application of these materials, together with related binary and ternary systems, to microwave, millimeter and optical devices were targeted. Doping profiles in GaAs which are difficult to produce by techniques other than MBE and which potentially offer enhanced characteristics for specific GaAs microwave and millimeter wave devices have been produced. InAs layers grown on InGaAs buffer layers have exhibited electron mobilities exceeding 30,000 cm(2)V(-1)s(-1) at 77 deg K. InP layers have been grown and analyzed using photoluminescence which demonstrated the existence of iron out-diffusion from the Fe-doped InP substrate. InGaAs layers grown in a heterostructure FET system showed an improvement in electron mobilities over those of GaAs FETs grown under similar conditions. GRA

N82-34283# Harry Diamond Labs., Adelphi, Md.

CHARGE PENETRATION EFFECTS IN RARE-EARTH CRYSTAL FIELDS

Clyde A. Morrison Jun. 1982 31 p refs

(AD-A117494; HDL-TR-1990) Avail: NTIS HC A03/MF A01 CSCL 20/2

The theory of charge penetration by a rare-earth ion into the charge distribution on a ligand has been developed. The results are cast into a form reminiscent of the Sternheimer shielding factors, sigma n, which relate the observed A prime nm < r to the nth power > to the lattice sum A nm < r to the nth power > in the form A prime nm < r to the nth power > = A prime nm < r to the nth power > (1 - sigma n). The corresponding form developed here is A prime nm < r to the nth power > = A prime nm < r to the nth power > (1 - delta n(x,y)/< r to the nth power >) with explicit expressions given for the delta n(x,y). The delta n(x,y) is then expanded for small x, and a form convenient for calculation is given. The results obtained here can be used with the three-parameter theory of crystal fields to obtain crystal field parameters Bnm (tau;q eta gamma), which give a better representation of the phenomenological Bnm than we obtained previously. Author (GRA)

N82-34284# Wright State Univ., Dayton, Ohio. Dept. of Physics.

RADIATION DAMAGE AND ANNEALING EFFECTS STUDIES OF SILICON-IMPLANTED GALLIUM ARSENIDE Final Report, Apr. - Dec. 1981

Samuel C. Ling 31 Mar. 1982 15 p

(Grant AF-AFOSR-0101-81; AF Proj. 2301)

(AD-A117884; AFOSR-82-0618TR) Avail: NTIS HC A02/MF A01 CSCL 20/2

Radiation damage and low temperature (200 degrees-600 degrees C) annealing behavior of 120 keV silicon and selenium

ion implants into gallium arsenide have been investigated by Rutherford Backscattering-Channeling and Transmission Electron Microscopy techniques. Lattice location studies of Si implants after high temperature annealing (850 degrees and 950 degrees C) have been conducted using Proton Induced X-Ray Emission method. Author (GRA)

N82-34285# California Univ., Los Angeles. Dept. of Physics.
CHARACTERIZATION OF INFRARED OPTICAL PROPERTIES OF LAYERED SEMICONDUCTORS Annual Scientific Report, 1 Apr. 1981 - 31 Mar. 1982
Rubin Braunstein 20 Mar. 1982 17 p
(Grant AF-AFOSR-3665-78; AF Proj. 2306)
(AD-A117729; AFOSR-82-0581TR) Avail: NTIS HC A02/MF A01 CSCL 20/12

The techniques of infrared wavelength modulation and the techniques of photo-induced-transients-spectroscopy were used to study the electronic structure and lattice dynamics of semiconductors. These studies have included: (1) the assessment of homogeneity of doping and strain in layer semiconductors; (2) the electronic structure of deep levels by wavelength modulation; and (3) study of deep levels by photoinduced transients spectroscopy. The present work was primarily directed toward GaAs and Si. Author (GRA)

N82-34286# Amorphous Materials, Inc., Garland, Tex.
LARGE PLATE CdTe SYNTHESIS BY SEALED VESSELS TRANSPORT Quarterly Technical Report, 1 May - 30 Jun. 1982
A. R. Hilton Jul. 1982 35 p refs
(Contract MDA903-82-C-0159; ARPA Order 4383)
(AD-A117524; AMI-008; QTR-2) Avail: NTIS HC A03/MF A01 CSCL 20/2

The second quarterly report for the program to grow large plates of CdTe by vapor transport in a sealed system covers the period May-June, 1982. Altogether 14 attempts have been made to compound CdTe and then transport the material into a separate plate chamber. Plates 6" in diameter have been formed only twice. Progress has been hampered by quartz failure believed due to attack by cadmium vapor. Failure to transfer is believed to be due to deviation from stoichiometry and plugging of the transfer tube between the two chambers. A process change planned for next quarter should eliminate these problems. Author (GRA)

N82-34287# Cornell Univ., Ithaca, N. Y. Dept. of Materials Science and Engineering.
DIFFRACTION AND MICROSCOPY STUDIES OF THE STRUCTURE OF GRAIN BOUNDARIES IN Fe, Fe-BASE ALLOYS, AND CERAMIC MATERIALS Progress Report
S. L. Sass Mar. 1982 8 p
(Contract DE-AC02-81ER-10956)
(DE82-009553; DOE/ER-10956/1) Avail: NTIS HC A02/MF A01

Information is obtained on the atomic structure of grain boundaries in b.c.c. metals and ceramics. Segregation influence on grain boundary structure in Fe-base alloys is discussed. Stoichiometric changes of the boundary structures of ceramic materials are also discussed. DOE

N82-34288# Oak Ridge National Lab., Tenn.
MULLITE-TITANIUM DIOXIDE SOLID SOLUTIONS
F. A. Matveeva, M. M. Dosik, and A. G. Merkulov Jan. 1982 17 p refs Transl. into ENGLISH from A Akad. Nauk SSR, Sibir. Otd. (USSR), 1972 p 37-46
(Contract W-7405-eng-26)
(DE82-009031; ORNL-tr-4825) Avail: NTIS HC A02/MF A01

The nature of TiO2 entering the mullite structure was studied, and the limiting concentration of TiO2 incorporated into the mullite lattice was sought. The conclusions are that on heating kaolin and TiO2 at 1300 to 16000 C, the crystal phase generated is mostly a solid solution of TiO2 in mullite. The mullite-TiO2 solid solution forms through the isomorphous substitution of Ti(4) ions for Si(4) ions in the mullite structure (tetrahedral lattice framework). The limiting concentration of TiO2 in mullite solid solution is 4%. Above 4%, the TiO2 excess is in the free state as rutile. On heating up to 13000, TiO2 does not interact with mullite, and is in the crystal phase in the free state. DOE

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-34289# Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics.
MEAN FIELD THEORY FOR LATTICE GAUGE SYSTEMS WITH FERMIONS
Roger Horsley Sep. 1981 19 p refs Supported in part by the Israel Commission for Basic Research and the US-Israel Binational Science Foundation
(DE82-700785; WIS-Ph-81-50) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

Mean field calculations for lattice gauge theories are extended to include fermions. The addition of a Wilson fermion leads to an almost negligible change of the weak to strong coupling transition point. The plaquette average is also only weakly affected. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N82-34290# North Atlantic Treaty Organization. Military Agency for Standardization.
NATO GLOSSARY OF TERMS AND DEFINITIONS (ENGLISH AND FRENCH)
10 Feb. 1982 397 p In ENGLISH and FRENCH
(AD-A117715; AAP-6(P)) Avail: NTIS HC A17/MF A01 CSCL 05/2

Definitions of terms used in, or associated with the military are provided in both English and French listings. Author (GRA)

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-34291*# Stanford Univ., Calif. Program in Information Policy.
PRIVATE FINANCING AND OPERATION OF A SPACE STATION: INVESTMENT REQUIREMENTS, RISK, GOVERNMENT SUPPORT AND OTHER PRIMARY BUSINESS MANAGEMENT CONSIDERATIONS Final Report
Michael Simon Sep. 1982 31 p refs
(Contract NASw-3204)
(NASA-CR-169357; NAS 1.26:169357; Rept-43) Avail: NTIS HC A03/MF A01 CSCL 05A

Private investment in a manned space station is considered as an alternative to complete government sponsorship of such a program. The implications of maned space operations are discussed from a business perspective. The most significant problems and risks which would be faced by a private company involved in a space station enterprise are outlined and possible government roles in helping to overcome these difficulties suggested. Economic factors such as inflation and the rate of interest are of primary concern, but less obvious conditions such as antitrust and appropriate regulatory laws, government appropriations for space activities, and national security are also considered. J.D.

N82-34292# Florida Univ., Gainesville. Dept. of Industrial and Systems Engineering.
PRODUCTION LOT SIZING AND THE POWER OF 2
Thom J. Hodgson, Marc Lambrecht (Katholieke Univ. Leuven, Belgium), and Jacques VanderEecken (Katholieke Univ. Leuven, Belgium) Jun. 1982 28 p refs Sponsored in part by Onderzoeksfonds K. U. Leuven
(Contract N00014-76-C-0096)
(AD-A116929; RR-82-8) Avail: NTIS HC A03/MF A01 CSCL 05/1

In this paper the concept of power of two lot sizing is presented. A model (one of many possible) of a simple production system is formulated illustrating the use of the concept. The model has the form of a 0-1 integer linear program. A numerical example is presented and, finally, an extension to include more complex production systems is presented. Author (GRA)

N82-34293# Polytechnic Inst. of New York, Brooklyn. Dept. of Electrical Engineering and Computer Science.
SCHEDULING MAINTENANCE OPERATIONS WHICH CAUSE AGE-DEPENDANT FAILURE RATE CHANGES
L. Shaw, B. Ebrahimian, and Jack-Kang Chan Apr. 1982 14 p refs
(Contract N00014-75-C-0858)
(AD-A117267; POLY-EE/CS-82-003) Avail: NTIS HC A02/MF A01 CSCL 15/5

We consider optimization of schedules for maintenance or repairs, in order to minimize long term average operating cost or to maximize availability. The novelty here is that the failure rate after a maintenance operation is a function of the system's previously expended lifetime. This generalizes earlier work by others on the simpler case where the future rate depends only on the number of previous repairs, but not on the times when they took place. The underlying lifetime distributions are assumed to have the Weibull form and two classes of maintenance strategies are considered. The first case optimizes a set of successive maintenance intervals where a replacement by a new system is made. In the second case, the period of periodic maintenance is optimized numerically. The main contribution in that case is the formulation of the new failure rate model, and the efficient organization of the optimization calculations. GRA

N82-34294# Polytechnic Inst. of New York, Brooklyn. Dept. of Electrical Engineering and Computer Science.
STOCHASTIC AVAILABILITY OF A REPAIRABLE SYSTEM WITH AN AGE AND MAINTENANCE DEPENDENT FAILURE RATE
Jack-Kang Chan Jun. 1982 115 p refs
(Contract N00014-75-C-0858; NR Proj. 047-203)
(AD-A116932; POLY-EE/CS-82-004) Avail: NTIS HC A06/MF A01 CSCL 09/2

A general repairable system model is proposed with a maintenance schedule such that the failure rate is reduced after each preventive maintenance. The model introduces naturally the concept of system availabilities as random variables. Probability distributions of the stochastic availabilities are derived. The stochastic availability is optimized with respect to the duration of the operating interval between maintenance operations, and with respect to an age replacement policy. Analysis and optimization are achieved by a PASCAL computer program which is developed for computations and illustrations of various failure rate characteristics and parameter variations. The concept is further extended to stochastic cost function or generalized stochastic availability. Author (GRA)

N82-34295# Air Force Human Resources Lab., Brooks AFB, Tex. Analysis and Evaluation Office.
FIGURES OF MERIT: USE AND INTERPRETATION IN EVALUATING PROGRAM ALTERNATIVES Final Technical Paper
Thomas A. Boynton Jun. 1982 6 p Submitted for publication
(AD-A117233; AFHRL-TP-82-14) Avail: NTIS HC A02/MF A01 CSCL 05/2

This technical paper defines three figures of merit: the standard benefit cost ratio, net benefit, and the research and development (R&D) leverage ratio. It then discusses the mathematical relationships which exist among the figures of merit. Specific attention is given to the conditions under which the R&D leverage ratio is greater than the standard benefit cost ratio. Finally, a brief discussion is presented of subjective factors that must be considered in interpreting these figures of merit for the purpose of selecting from among a number of program alternatives. Author (GRA)

N82-34296# General Accounting Office, Washington, D. C. Procurement Logistics and Readiness Div.
AIRCRAFT THRUST/POWER MANAGEMENT CAN SAVE DEFENSE FUEL, REDUCE ENGINE MAINTENANCE COSTS AND IMPROVE READINESS
29 Jul. 1982 52 p refs
(AD-A117935; GA/PLRD-82-74) Avail: NTIS HC A04/MF A01 CSCL 05/1

The Department of Defense spends billions of dollars annually on aircraft fuel and engine maintenance. Thrust/power management offers Defense the potential to save fuel and reduce engine maintenance by improving fuel efficiency and extending engine parts life. Improved fuel efficiency can increase flying hours and thus improve aircrew proficiency and readiness. Extended engine life can reduce frequency of maintenance and thereby increase aircraft availability and readiness. An effective thrust/power management program is vital to the Defense mission from a readiness, energy, and maintenance standpoint. The implications on readiness are quickly apparent when considering that flying hours were reduced in face of rapidly rising fuel costs. When considering the billions of dollars spent of aircraft fuel and maintenance, thrust/power management offers great potential for reducing these costs. GRA

N82-34297# Naval Personnel Research and Development Center, San Diego, Calif.
A SYSTEM FOR ASSESSING USER RESPONSE TO NAVPERRANDCEN RDT/E PRODUCTS Final Report, Oct. 1981 - Mar. 1982
Harold H. Rosen Jun. 1982 20 p refs
(AD-A117719; NPRDC-SR-82-29) Avail: NTIS HC A02/MF A01 CSCL 05/1

A user-oriented system for assessing user response was developed. In this system, a report on a product and an evaluation request are mailed to previously identified users for appropriate action. Results indicate that the system has great potential for initiating and maintaining a productive dialogue between researchers and operational consumers. Data provided can be used to improve the quality of R&D management decisions by offering both long-term trend information and immediate feedback regarding product utilization. Author

N82-34298# Southwest Research Inst., San Antonio, Tex.
BASIC TECHNIQUES IN AVAILABILITY ENGINEERING Final Report
A. Sharif-Homayoun, R. D. Shirley, B. M. Tashjian, V. B. Parr, R. H. Koppe, R. W. Keller, and K. R. VanHowe May 1982 164 p refs Prepared in cooperation with Stoller (S. M.) Corp.
(EPRI Proj. 1391-2)
(DE82-903666; EPRI-NP-2166) Avail: NTIS HC A08/MF A01

Power plant productivity improvement can be achieved through application of the principles of availability engineering and decision analysis. Germaine to the application of these methodologies is the correct data usage in equations, algorithms, and criteria such that the applications result in the best decision for productivity improvement. The basic techniques of availability engineering are developed, and examples are presented for each element. DOE

N82-34299# American Univ., Washington, D. C. Inst. for Applied Public Financial Management.
ESTABLISHING A RELIABLE SOURCE OF FUEL FOR DEPARTMENT OF DEFENSE REQUIREMENTS: EFFECTIVE PETROLEUM, OIL AND LUBRICANT FINANCIAL MANAGEMENT Final Report

Thomas F. Scherer Dec. 1981 99 p refs Sponsored in part by the Defense Fuel Supply Center
(PB82-170812; Rept-115-80-7) Avail: NTIS HC A05/MF A01 CSCL 05A

Procurement options available as a result of changes in the energy market are analyzed. Both direct and indirect methods of acquiring products are considered. It is shown that the only viable solution to DFSC's problem lies in purchasing the desired quantities using direct acquisition methods and by reducing the cost incurred to a refiner for supplying military products. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N82-34300*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SURVEY OF READER PREFERENCES CONCERNING THE FORMAT OF NASA TECHNICAL REPORTS
Thomas E. Pinelli, Myron Glassman (Old Dominion Univ.), and Virginia M. Cordle (Coll. of William and Mary, Williamsburg, Va.) Aug. 1982 86 p refs
(NASA-TM-84502; NAS 1.15:84502) Avail: NTIS HC A05/MF A01 CSCL 05B

A survey was conducted to determine the opinions of readers concerning the format (organization) of NASA technical reports and usage of technical report components. A survey questionnaire was sent to 513 LaRC engineers and scientists and 600 engineers and scientists from three (3) professional/technical societies. The response rates were 74 and 85 percent, respectively. The questionnaire included the order in which users read report components, the components reviewed or read to determine whether to read a report, report components which could be deleted, the desirability of a table of contents, the desirability of both a summary and abstract, the location of the symbols list and glossary, the integration of illustrative material, the preferred format for reference citations, column layout and right margin treatment, and person/voice. The results of the reader preference survey indicated that the conclusion was the component most often ready by survey respondents. The summary, conclusion, abstract, title page, and introduction were the components used most frequently to determine if a report would actually be read. Respondents indicated that a summary as well as an abstract should be included, that the definition of symbols and glossary of terms should be located in the front of the report, and that illustrative material should be integrated with the text rather than grouped at the end of the report. Citation by number was the preferred format for references. A one-column, ragged right margin was preferred. Third person, passive voice was the style of writing preferred by the respondents. Author

N82-34301# Illinois Univ., Champaign.
CATEGORY AND WORD SEARCH: GENERALIZING SEARCH PRINCIPLES TO COMPLEX PROCESSING
Arthur D. Fisk and Walter Schneider Mar. 1982 37 p refs
(Contract N00014-81-K-0034)
(AD-A115130; HARL-ONR-8103) Avail: NTIS HC A03/MF A01 CSCL 05/10

The research examines how the major phenomena in simple visual search generalize to searching for words and categories of words. Seven prominent effects in the visual search literature are reviewed. Experiment 1 examined word and category visual search when the targets and distractor sets had a varied mapping (VM) across trials. Reaction time was a linear function of the number of comparisons with a positive slope of 48 msec per word, 92 msec per category. Results suggest self-terminating search with reaction time being a linear function of memory and display comparisons with little or no improvement with practice. Experiment 2 examined search with a consistent mapping between targets and distractors. Category search slope dropped to 2 msec and became non-linear. Word search slope dropped to 18 msec but was still linear. Experiment 3 examined simultaneous category detection and a concurrent serial recall digit-span task. Subjects could simultaneously perform the digit-span task and CM category search without deficit. However, combining VM category search and the digit-span task resulted in substantial performance deficit. The generality of effects across stimulus complexity levels and four principles of search processing are discussed with regard to automatic/control processing theory and production systems. Author (GRA)

N82-34302# Environmental Science and Engineering, Inc., Gainesville, Fla.
RESEARCH AND DEVELOPMENT SERVICES: METHODS DEVELOPMENT Final Report, 24 Dec. 1980 - 24 Jul. 1982
J. J. Mousa, D. H. Powell, R. E. Hall, A. L. Shroads, J. W. Johnson, C. M. Mark, D. M. Victor, and A. C. Moore 23 Jul. 1982 180 p refs
(Contract DAAK11-81-C-0081)
(AD-A117643; DRXTH-TE-CR-82165; Rept-81-401-400) Avail: NTIS HC A09/MF A01 CSCL 07/4

Method development was conducted to develop analytical methods for eight munition-related compounds in water and soil matrices. Single-analyte and multiple-analyte procedures were developed using GC (gas chromatography) and HPLC (high performance liquid chromatography) techniques. Precision and accuracy testing of the methods was performed in natural and standard matrices. GRA

N82-34303# Air Univ., Maxwell AFB, Ala.
MISIL, TOO BIG TO FLY Student Report
Rowena R. Lafferty 1981 17 p refs
(AD-A117940) Avail: NTIS HC A02/MF A01 CSCL 05/1

The Management Information System, International Logistics integrated data base was established. The goals of the system are to keep Navy financial and supply records compatible and accurate with a minimum of resources. It is demonstrated that these goals cannot be achieved without additional data base structural changes. Author

N82-34304# George Washington Univ., Washington, D.C. School of Engineering and Applied Science.
INFORMATION DISPLAY SYSTEMS. SUMMARY OF PROJECT STATUS
Michael B. Feldman and James D. Foley Mar. 1982 25 p refs
(Contract DE-AS05-79ER-10521)
(DE82-009971; DOE/ER-10521/T1; GWU-IIST-82-04) Avail: NTIS HC A02/MF A01

Methodologies and tools which can aid in the design and evaluation of user-computer interfaces are developed. Structure is imposed on the typically very complex task of designing a user-computer interface, so the design can be divided into manageable pieces, each of which can be dealt with in a systematic, rigorous and at least partially guantitative way. The actual process of designing a user interface can be accomplished as four major steps, which is called the conceptual, semantic, syntactic, and lexical design steps. Each step can be dealt with in sequencies; one after the other, with an occasional reexamination of a previous step. These four steps are called a design framework. DOE

N82-34305# Office of Management and Budget, Washington, D.C.
IMPROVING GOVERNMENT INFORMATION RESOURCES MANAGEMENT
Mar. 1982 121 p
(PB82-183542) Avail: NTIS HC A06/MF A01 CSCL 05B

Federal agency efforts to improve Federal information resources management is highlighted. The two basic tenets of the management strategy are explained. Information resources

management should entail the management of the total information life cycle from collection to dissemination. Information is an economic resource and should be managed as other economic resources are managed. The agency information resources management reviews that OMB will be monitoring and evaluating during the first year of the three year review cycle are reviewed. The 26 agencies included in this report were selected because they are heavily involved in information related activities (including information collection, use and dissemination), and/or they spend a significant portion of their budget on automatic data processing (ADP) or telecommunications activities or equipment. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-34306# Committee on Science and Technology (U. S. House).
NASA AUTHORIZATION AND NOAA LANDSAT AUTHORIZATION FOR 1983, VOLUME 2
Washington GPO 1982 1759 p refs Hearings before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 2d Sess., 5, 9, 10, 12, 13, 15, 22-25 Feb. and 2-4 Mar. 1982
(GPO-93-418) Avail: Subcommittee on Space Science and Applications

A series of hearings on the NASA fiscal year 1983 budget request is presented. Balance across disciplines of space science, applications, and aeronautics and with regard to balance of program thrust between civil and military activities is addressed. N.W.

N82-34307# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
ANALYSIS OF NASA'S FISCAL YEAR 1983 BUDGET REQUEST FOR RESEARCH AND DEVELOPMENT TO DETERMINE THE AMOUNT THAT SUPPORTS DOD'S PROGRAMS
26 Apr. 1982 10 p refs
(B-207165; MASAD-82-33) Avail: NTIS HC A02/MF A01

The balance between NASA'S civilian and military activities are evaluated. The fiscal year 1983 budget was reviewed to identify those programs that support the Department of Defense. The research and development appropriation and the construction of facilities appropriation were reviewed in relation to military support activities. S.L.

N82-34308# Committee of Conference (U. S. Congress).
MAKING APPROPRIATIONS FOR THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington GPO 1982 13 p Rept. to accompany H.R. 5890 presented by the Comm. of Conf., 97th Congr., 2nd Sess., 29 Sep. 1982
(H-Rept-97-897; GPO-89-006) Avail: US Capitol, House Document Room

The appropriations to the National Aeronautics and Space Administration for resarch and development, construction of facilities, and research and program management, etc. are presented. The amounts of money requested, and the final appropriations are discussed. S.L.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N82-34309# Committee on Commerce, Science, and Transportation (U. S. Senate).
TECHNOLOGY TRANSFER IN NEW MEXICO
Washington GPO 1981 59 p Hearing before the Subcomm. on Sci., Technol., and Space of the Comm. on Com., Sci., and Transportation, 97th Congr., 1st Sess., 18 Aug. 1981
(GPO-85-343) Avail: Subcommittee on Science, Technology, and Space

Countering the erosion of American preeminence in the successful commercialization of new technology without resorting to restrictive trade policies and other policies that are counter to free enterprise is discussed. N.W.

N82-34310# General Accounting Office, Washington, D. C.
MAJOR SCIENCE AND TECHNOLOGY ISSUES
30 Jan. 1981 59 p refs
(PAD-81-35) Avail: NTIS HC A04/MF A01

The critical science and technology issues facing the Nation are identified. The organization and process of science and technology policymaking, science and technology resource base, relationships within the science and technology system, and application and diffusion of science and technology are evaluated. S.L.

N82-34311*# Mechanical Technology, Inc., Latham, N. Y.
AUTOMOTIVE STIRLING ENGINE MOD 1 DESIGN REVIEW, VOLUME 1 Final Report
Aug. 1982 654 p refs Presented at Automotive Stirling Engine (ASE) Mod 1 Engine Design Review, Cleveland, 22-23 May 1980 3 Vol.
(Contracts DEN3-32; DE-AI01-77CS-51040)
(NASA-CR-167935; DOE/NASA/0032-16-Vol-1; NAS 1.26:167935; MTI-80ASE142DR1-Vol-1) Avail: NTIS HC A99/MF A01 CSCL 13F

Risk assessment, safety analysis of the automotive stirling engine (ASE) mod I, design criteria and materials properties for the ASE mod I and reference engines, combustion are flower development, and the mod I engine starter motor are discussed. The stirling engine system, external heat system, hot engine system, cold engine system, and engine drive system are also discussed. N.W.

N82-34312*# Mechanical Technology, Inc., Latham, N. Y.
AUTOMOTIVE STIRLING ENGINE MOD 1 DESIGN REVIEW, VOLUME 3 Final Report
Aug. 1982 362 p refs Review held in Cleveland, 22-23 May 1980 3 Vol.
(Contracts DEN3-32; DE-AI01-77CS-51040)
(NASA-CR-167397; DOE/NASA/0032-18-Vol-3; NAS 1.26:167937; Rept-80ASE142DR1-Vol-3) Avail: NTIS HC A16/MF A01 CSCL 13F

Engineering drawings for the stirling engine, external heat, hot and cold engine, engine drive, and control systems and auxiliaries are provided. Vehicle integration is also illustrated. N.W.

86 SPACE SCIENCES (GENERAL)

N82-34313*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A BIBLIOGRAPHY OF PLANETARY GEOLOGY PRINCIPAL INVESTIGATORS AND THEIR ASSOCIATES, 1981 - 1982 Final Report

Jeffrey B. Plescia, comp. Washington NASA Sep. 1982 97 p Sponsored by NASA

(NASA-CR-3593; NAS 1.26:3593) Avail: NTIS HC A05/MF A01 CSCL 03B

Over 800 publications submitted by researchers supported through NASA's Planetary Geology Program are cited and an author/editor index is provided. Entries are listed under the following subjects: (1) general interest topics; (2) solar system, comets, asteroids, and small bodies; (3) geologic mapping, geomorphology, and stratigraphy; (4) structure, tectonics, geologic and geophysical evolution; (5) impact craters: morphology, density, and geologic studies; (6) volcanism; (7) fluvial, mass wasting, and periglacial processes; (8) Eolian studies; (9) regolith, volatile, atmosphere, and climate; (10) remote sensing, radar, and photometry; and (11) cartography, photogrammetry, geodesy, and altimetry. A.R.H.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-34314*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

EINSTEIN OBSERVATORY SOLID STATE SPECTROMETER OBSERVATIONS OF M87 AND THE VIRGO CLUSTER

Susan M. Lea (San Francisco State Univ.), Richard F. Mushotzky, and Stephen S. Holt May 1982 32 p refs Submitted for publication

(NASA-TM-83946; NAS 1.15:83946) Avail: NTIS HC A03/MF A01 CSCL 03A

X-ray observations of the galaxy M87 and of a region in the Virgo cluster displaced 7 minutes from the center of M87 are presented. X-ray spectra are obtained at these two locations with the slid state spectrometer onboard the Einstein Observatory. Emission lines were observed in both locations, indicating the presence of heavy elements at abundances approximately solar (to within a factor of 2). A temperature gradient, T increases from approximately 1.4 keV at the position of M87 to T approximately 3.35 keV 7' away, was detected. There is lower temperature thermal emission at the center of M87 with T approximately 0.6 keV, consistent with models for cooling flows in this cluster. In addition to the thermal emission, a power law component in the spectrum of M87, was detected consistent with that observed by HEAO-1, indicating that this component probably originates in the galaxy itself. The presence of intracluster gas having density approximately .001 cu cm and temperature approximately 30 million K is indicated. S.L.

N82-34315*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

SHUTTLE VLBI EXPERIMENT. TECHNICAL WORKING GROUP SUMMARY REPORT

Samuel H. Morgan, ed. and David H. Roberts, ed. (Brandeis Univ.) Jul. 1982 53 p

(NASA-TM-82491; NAS 1.15:82491) Avail: NTIS HC A04/MF A01 CSCL 03A

The gain in interferometric resolution of extragalactic sources at radio frequencies which can be achieved by placing a very long baseline interferometry (VLBI) antenna in space is quantitatively described and a VLBI demonstration experiment using a large deployable antenna, which if realized could be a very acceptable first venture for VLBI in space is discussed. A tutorial on VLBI, a summary of the technology available for the experiment, and a preliminary mission scenario are included. A.R.H.

N82-34316*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.

EVIDENCE FOR EXTENDED CHROMOSPHERES SURROUNDING RED GIANT STARS

Robert E. Stencel 1982 10 p refs Sponsored by NASA

(NASA-CR-169349; NAS 1.26:169349) Avail: NTIS HC A02/MF A01 CSCL 03A

Observational evidence and theoretical arguments are summarized which indicate that regions of partially ionized hydrogen extending several stellar radii are an important feature of red giant and supergiant stars. The implications of the existence of extended chromospheres are examined in terms of the nature of the other atmospheres of, and mass loss from cool stars. M.G.

N82-34317*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.

ULTRAVIOLET AND X-RAY DETECTION OF THE 56 PEG SYSTEM (KO 2P + WD)

Mark Schindler, R. E. Stencel, J. L. Linsky, G. Basri (California Univ., Berkeley), and D. Helfand (Columbia Univ., New York) [1982] 9 p refs

(Grants NAG5-82; NGL-06-003-057)

(NASA-CR-169351; NAS 1.26:169351) Avail: NTIS HC A02/MF A01 CSCL 03A

Both IUE short and long wavelength exposures of the 56 Peg system are discussed. This mild barium star has an X-ray luminosity of 3 x 10 to the 31st power ergs/1, comparable to the rapidly rotating RS CVn binary systems, yet lies in a region of the HR diagram where stellar X-rays are generally not observed. This cool, bright giant is not a rapid rotator and the key to understanding its emission lies in the recent discovery of its white dwarf companion. Accretion onto the white dwarf of approximately 0.1% of the stellar wind of the primary is sufficient to power an X-ray source of the observed luminosity. Reprocessing of the X-rays in the cool dense stellar wind explains the origin of the UV emission line spectrum, and may explain the time varying asymmetry of the Mg 2 kappa line profile that is observed. Graphs which show observed fluxes and wavelengths are discussed. A.R.H.

N82-34318*# Joint Inst. for Lab. Astrophysics, Boulder, Colo.

THE STRUCTURE, ENERGY BALANCE, AND WINDS OF COOL STARS

Jeffrey L. Linsky 1982 11 p refs Presented at the 3rd European IUE Conf., Madrid, May 1982

(Grant NGL-06-003-057)

(NASA-CR-169356; NAS 1.26:169356) Avail: NTIS HC A02/MF A01 CSCL 03A

The phenomena associated with magnetic fields in the Sun are summarized and it is shown that similar phenomena occur in cool stars. High dispersion spectra are providing unique information concerning densities, atmospheric extension, and emission line widths. A recent unanticipated discovery is that the transition lines are redshifted (an antiwind) in beta Dra (G2 Ib) and perhaps other stars. This is interpreted as indicating downflows in closed magnetic flux tubes as are seen in the solar flux tubes above sunspots. The G and K giants and supergiants are classified as active stars, quiet stars, or hybrid stars depending on whether their atmospheres are dominated by closed magnetic flux tubes, open field geometries, or a predominately open geometry with a few closed flux tubes embedded. A.R.H.

N82-34319*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

CATALOG OF INFRARED OBSERVATIONS

D. Y. Gezari, M. Schmitz (Computer Sciences Corp.), and J. M. Mead Apr. 1982 640 p refs

(NASA-TM-83819; NAS 1.15:83819) Avail: NTIS HC A99/MF A01 CSCL 03A

The infrared astronomical data base and its principal data product, the catalog of Infrared Observations (CIO), comprise a machine readable library of infrared (1 microns to 1000 microns astronomical observations. To date, over 1300 journal articles and 10 major survey catalogs are included in this data base, which contains about 55,000 individual observations of about 10, 000 different infrared sources. Of these, some 8,000 sources are identifiable with visible objects, and about 2,000 do not have known visible counterparts. S.L.

N82-34320*# Huygens Laboratium, Leiden (Netherlands).
IDENTIFICATION OF THE EMISSION FEATURES NEAR 3.5 MICRONS IN THE PRE MAIN SEQUENCE STAR HD 97048
F. Baas, L. J. Allamandola, T. R. Geballe (Mount Wilson Observatory), S. E. Persson (Mount Wilson Observatory), and J. H. Lacy (Palomar Observatory) [1982] 16 p refs Sponsored in part by NASA, NSF and the Dutch Organization for the Advancement of Pure Research
(NASA-CR-169379; NAS 1.26:169379) Avail: NTIS HC A02/MF A01 CSCL 03A

The spectrum of HD97048 was measured with a resolving power of 450 between 3.37 and 3.64 microns. The prominent feature near 3.5 microns is well resolved, with a peak at 3.53 microns and a wing extending to a shorter wavelength. The weaker feature near 3.4 microns is found to peak at 3.43 microns, in contrast to the 3.40 micron feature seen in other astronomical objects. The observed spectrum strongly resembles laboratory spectra of mixtures of monomeric and dimeric formaldehyde embedded in low temperature solids. Of various possible excitation mechanisms, ultraviolet pumped infrared fluorescence of formaldehyde in interstellar grains provides the best explanation for the observed spectrum of HD 97048. M.G.

N82-34321# California Inst. of Tech., Pasadena.
OBSERVATIONS OF THE REFLECTION NEBULA NGC 7023 AT 2.2 MICRONS
K. Sellgren and S. E. Whitcomb [1982] 28 p refs Submitted for Publication Prepared in cooperation with Carnegie Inst., Washington, D.C.
Avail: NTIS HC A03/MF A01

Near infrared observations were made of the reflection nebula NGC 7023 and of its illuminating star, the Herbig Be star HD 200775. The surface brightness of NGC 7023 was mapped at 2.2 microns. The extended 2.2 micron emission resembles the visual surface brightness, peaking approximately 30 sec north of HD 200775 and extending over a radius of approximately 90 min. Spectra with 5% resolution of the nebula and HD 200775 from 1.5 to 2.5 microns are flat and featureless with the nebula slightly redder than the star. The extended 2.2 micron emission cannot be explained by free-free emission, thermal dust emission, or faint stars. It is suggested that the near infrared emission is due to reflected light. From model independent agruments, a lower limit to the 2.2 micron albedo of omega $>$ or $=$ 0.5 is derived. M.G.

N82-34322*# Mississippi State Univ., State College. Engineering and Industrial Research Station.
ANALYSIS OF SPACE TELESCOPE DATA COLLECTION SYSTEM Interim Final Report,1 Jul. 1981 - 31 Jul. 1982
Frank M. Ingels and W. O. Schoggen 1982 72 p refs
(Contract NAS8-33570)
(NASA-CR-162090; NAS 1.26:162090; MSSU-EIRS-EE-82-3) Avail: NTIS HC A05/MF A01 CSCL 03A

An analysis of the expected performance for the Multiple Access (MA) system is provided. The analysis covers the expected bit error rate performance, the effects of synchronization loss, the problem of self-interference, and the problem of phase ambiguity. The problem of false acceptance of a command word due to data inversion is discussed. A mathematical determination of the probability of accepting an erroneous command word due to a data inversion is presented. The problem is examined for three cases: (1) a data inversion only, (2) a data inversion and a random error within the same command word, and a block (up to 256 48-bit words) containing both a data inversion and a random error.
Author

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-34323*# Georgia Inst. of Tech., Atlanta. School of Geophysical Sciences.
LIGHT SCATTERING CALCULATIONS FOR THE NEPHELOMETER EXPERIMENT ON THE 1981/1982 JUPITER ORBITER-PROBE MISSION Final Technical Report, 1 Mar. 1978 - 30 Nov. 1981
Gerald W. Grams Sep. 1982 14 p refs
(Grant NsG-2306)
(NASA-CR-169418; NAS 1.26:169418) Avail: NTIS HC A02/MF A01 CSCL 03B

A variety of studies were carried out to help establish the accuracy of quantities describing physical characteristics of cloud particles (such as size, shape, and composition) that are to be inferred from light scattering data obtained with the nephelameter experiment on the Galileo spacecraft. The objectives were to provide data for validating and testing procedures for analyzing the Galileo nephelameter data with light scattering observations in a variety of on-going laboratory and field measurement programs for which simultaneous observations of the physical characteristics of the scattering particles were available. M.G.

N82-34324# Lincoln Lab., Mass. Inst. of Tech., Lexington.
EQUATORIAL MOTION ABOUT AN OBLATE PRIMARY
Laurence G. Taff 1 Jun. 1982 30 p
(Contract F19628-80-C-0002)
(AD-A117641; TR-610; ESD-TR-82-050) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report discusses motion in the equatorial plane of an oblate primary. Included are terms due to non-sphericity through J sub 2 in the potential. This problem is exactly soluble in the same sense that the ordinary two-body problem is exactly soluble. The full solution is given, the connection with perturbation theory (as J sub 2 yields 0) is demonstrated, and the stability of circular orbits is discussed. The analytical solution involves all three incomplete elliptic integrals which limits its transparency. GRA

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N82-34325*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A THEORY OF THE IO PHASE ASYMMETRY OF THE JOVIAN DECAMETRIC RADIATION
Kozo Hashimoto (Kyoto Univ., Japan) and Melvyn L. Goldstein Aug. 1982 34 p refs Submitted for publication
(NASA-TM-83994; NAS 1.15:83994) Avail: NTIS HC A03/MF A01 CSCL 03B

An explanation of an asymmetry in the occurrence probability of the Io-dependent Jovian decametric radiation is proposed. Io generates stronger Alfven waves toward the south when it is in the northern part of the torus. This wave then generates decametric radiation in the northern ionosphere after it reflects in the southern ionosphere. The asymmetry then results from computing the propagation time of the alfven wave along this trajectory. The ray paths of the decameter radiation are calculated using a three dimensional ray tracing program in the Jovian ionosphere. Variations in the expected probability plots are computer for two models of the Jovian ionosphere and global magnetic field, as well as for several choices of the ratio of the adiated frequency to the X-mode cutoff frequency. Author

N82-34326*# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
DETECTION OF NONTHERMAL CONTINUUM RADIATION IN SATURN'S MAGNETOSPHERE Progress Report

W. S. Kurth, F. L. Scarf (TRW Defense and Space Systems Group, Redondo Beach, Calif.), J. D. Sullivan (MIT, Cambridge), and D. A. Gurnett Mar. 1982 34 p refs Submitted for publication
(Contract NASw-3504; Grant NGL-16-001-043; Contracts JPL-954013; JPL-954012; JPL-953733; N00014-76-C-0016)
(NASA-CR-169231; NAS 1.26:169231; AD-A115787; UI-82-5) Avail: NTIS HC A03/MF A01 CSCL 03B

A detailed analysis of high resolution wideband data from the Voyager 1 and 2 plasma wave receivers has revealed the presence of heretofore undiscovered nonthermal continuum radiation trapped within the Saturnian magnetosphere. The discovery of Saturnian trapped continuum radiation fills a disturbing void in the Saturnian radio spectrum. On the basis of observations at both the Earth and Jupiter it was expected that continuum radiation should be a pervasive signature of planetary magnetospheres in general. Special processing of the Voyager I plasma wave data at Saturn has now confirmed the existence of weak emissions that have a spectrum characteristics of trapped continuum radiation. Similar radiation was also detected by Voyager 2; however, in this case it is not certain that Saturn was the only source. Considerable evidence exists which suggests that Saturn may have been immersed in the Jovian tail during the Voyager 2 encounter, so that Jupiter may provide an additional source of the continuum radiation detected by Voyager 2. Author (GRA)

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-34327*# Stanford Univ., Calif. Inst. for Plasma Research.
ON THE THERMAL STABILITY OF CORONAL LOOP PLASMA
S. K. Antiochos, A. G. Emslie, E. C. Shoub, and C.-H. An Aug. 1982 23 p refs
(Grants NGL-05-020-272; NAGw-92; Contract N00014-75-C-0673)
(NASA-CR-169347; NAS 1.26:169347; SU-SUIPR-931) Avail: NTIS HC A02/MF A01 CSCL 03B

The stability to thermal perturbation of static models of coronal loops is considered including the effects of cool, radiatively stable material at the loop base. The linear stability turns out to be sensitive only to the boundary conditions assumed on the velocity at the loop base. The question of the appropriate boundary conditions is discussed, and it is concluded that the free surface condition (the pressure perturbation vanishes), rather than the rigid wall (the velocity vanishes), is relevant to the solar case. The static models are found to be thermally unstable, with a growth time of the order of the coronal cooking time. The physical implications of these results for the solar corona and transition region are examined. A.R.H.

N82-34328*# Stanford Univ., Calif. Inst. for Plasma Research.
THE IMPULSIVE PHASE OF SOLAR FLARES. 2: CHARACTERISTICS OF THE HARD X-RAYS
John Leach and Vahe Petrosian 1982 48 p refs
(Grants NsG-7092; NSF ATM-81-16989)
(NASA-CR-169379; NAS 1.26:169379) Avail: NTIS HC A03/MF A01 CSCL 03B

The results of an investigation into the electron distribution in the general non-thermal models of solar flares were used to calculate the characteristics of the impulsive hard X-rays. The height distribution, the spectrum, the polarization, and directivity of the X-rays were observed and how these X-ray characteristics are affected by the parameters defining the model was investigated. An expression is obtained for the X-ray intensity as a function of source height which is an excellent fit under certain constraints. Some available data with spatial resolution are examined and it is shown that it is possible to reproduce these data adequately with the non-thermal model and to determine the values of the parameters describing the flares. M.G.

N82-34329# California Inst. of Tech., Pasadena.
INTERFEROMETRIC OBSERVATIONS OF SOLAR FLARE PRECURSORS AT 10.6 GHz Final Report, Oct. 1980 - Jan. 1982
G. J. Hurford and H. Zirin Hanscom AFB, Mass. AFGL Mar. 1982 44 p refs
(Contract F19628-81-K-0028; Grant NSF AST-79-16149; AF Proj. 2311)
(AD-A115870; AFGL-TR-82-0117) Avail: NTIS HC A03/MF A01 CSCL 03/2

The purpose of this study was to examine a data base of interferometric solar microwave data in order to identify, evaluate and interpret preflare microwave signatures, with reference to their possible role for the short-term prediction of solar flares. The data base used was acquired by the Owens Valley solar interferometer at 10.6 GHz between February 19, 1980 and March 31, 1981. Twenty-seven major flares which occurred between February 19 and August 31, 1980 and for which good quality interferometric data were available, were selected using optical, soft X-ray OR microwave flux criteria. These events were analysed in detail; very similar preflare signatures noted in four (15%) of the cases. Other unusual preflare behavior was noted in four additional cases. The most common signature was a step-like increase in signal amplitude, accompanied by a decrease or reversal in the degree of polarization. Physically, this precursive signature may be identified with the onset phase of solar flares, when slow heating in the metastable magnetic loops destabilize the system, leading to rapid energy release in the impulsive phase. The reason for the distinctive polarization signature is not understood at present, but may be related to the site of the heating within the magnetic loops. GRA

N82-34330# California Univ., San Diego, La Jolla. Center for Astrophysics and Space Sciences.
SOLAR FLARE STUDIES Final Scientific Report, 1 Jul. 1976 - 31 Jan. 1982
Richard C. Canfield 20 Mar. 1982 547 p refs
(Grant AF-AFOSR-3071-76; AF Proj. 2311)
(AD-A114269; UCSD-SP-82-17; AFOSR-82-0352TR) Avail: NTIS HC A23/MF A01 CSCL 03/2

The primary objective of the research described in this report was increased understanding of solar flares. In the course of the research, many tasks were carried out, which achieved not only the primary objective, but also secondary objectives in related areas. The research program started with active participation in the Skylab Solar Flare Workshop. New observations of solar flare spectra were obtained and interpreted in terms of basic solar flare mechanisms. It was shown that the basic process by which the X-ray radiation of flares is created is by heating the flare plasma to temperatures of about ten million degrees, through evaporation of the chromosphere. This process is driven both by beams of accelerated electrons and by thermal conduction. However, in the major flare for which data were interpreted, the principal energy release mechanism was found to be thermal in nature, implying that most of the flare energy is released in the form of heat, and not charged particles. Theoretical modeling methods were developed for understanding the spectra solar flares. These methods were applied to flare loop dynamics. The spectral signatures of both chromospheric evaporation and beams of accelerated electrons were established. Finally, a theorectical program of theoretical magnetohydrodynamic stability studies was begun. GRA

N82-34331# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA PROMPT REPORTS, NUMBER 446. PART 1: DATA FOR SEPTEMBER 1981, AUGUST 1981 AND LATE DATA. EXPLANATION OF DATA REPORTS ISSUED AS NUMBER 438 (SUPPLEMENT) FEBRUARY 1981
Helen E. Coffey, ed. Oct. 1981 153 p 3 Vol.
(PB82-171075; SGD-446-Pt-1; NOAA-81121501-Pt-1) Avail: NTIS HC A08/MF A01 CSCL 03B

In addition to an index for 1980 to 1981, data for October 1981 on alert periods, daily solar indices, solar flares, solar radio

emission, coronal holes, spacecraft observations, inferred interplanetary magnetic field polarities, mean solar magnetic fields, and Boulder Geomagnetic Substorm log are provided. Also provided is data for August 1981 on daily solar activity centers, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices, and radio propagation indices. Late data includes geomagnetic indices for July 1981. GRA

N82-34332# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA PROMPT REPORTS, NUMBER 447. PART 1: DATA FOR OCTOBER 1981, SEPTEMBER 1981 AND LATE DATE. EXPLANATION OF DATA REPORTS ISSUED AS NUMBER 438 (SUPPLEMENT) FEBRUARY 1981
Helen E. Coffey, ed. Nov. 1981 188 p 3 Vol.
(PB82-177726; SGD-447-Pt-1; NOAA-82012004-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 03B

In addition to an index for 1980 to 81, Data for October 1981 on alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, spacecraft observations, inferred interplanetary magnetic field polarities, mean solar magnetic field, and Boulder Geomagnetic Substorm Log are provided. Data for September 1981 on daily solar activity centers, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices and radio propagation indices is also given. Late data includes solar wind measurements, September 1981, regions of solar activity for August 1981, cosmic rays for June to August 1981, and geomagnetic indices for August 1981. GRA

N82-34333# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA COMPREHENSIVE REPORTS, NUMBER 447. PART 2: DATA FOR MAY 1981, FEBRUARY 1980 AND MISCELLANEA. EXPLANATION OF DATA REPORTS ISSUED AS NUMBER 438 (SUPPLEMENT) FEBRUARY 1981
Helen E. Coffey, ed. Nov. 1981 84 p 3 Vol.
(PB82-177734; SGD-447-Pt-2; NOAA-82012005-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 03B

In addition to an index for 1980 to 81, comprehensive reports provides data for May 1981 on: solar radio emission, solar X-ray radiation and mass ejections from the Sun. Solar flares for February 1980 are given including the daily flare indices. Miscellaneous data includes active regions for 4 April to 1 May 1981 and synoptic solar maps for 4 April to 1 May 1981. GRA

N82-34334# National Center for Atmospheric Research, Boulder, Colo. High Altitude Observatory.
THE WHITE LIGHT SOLAR CORONA: AN ATLAS OF K-CORONAMETER SYNOPTIC CHARTS, AUGUST 1980 - SEPTEMBER 1981
R. Fisher, C. Garcia, K. Rock, P. Seagraves, and E. Yasukawa Jan. 1982 126 p refs
(Grant NSF ATM-77-23757)
(PB82-179706; NCAR/TN-188) Avail: NTIS HC A07/MF A01 CSCL 03B

A synoptic observing program was undertaken at the Mauna Loa Solar Observatory, a site operated by the High Altitude Observatory to study the solar corona using the Mark III K-Coronameter. Daily polarized brightness (pB) images were used to extract three pB () azimuthal scans located at heights of 1.3, 1.7, and 2.1 Rq. Four final data products are given in this atlas: (1) interpolated pB contour plots for h = 1.3 and 1.7 Rq for each Carrington rotation; (2) shaded pB charts for each Carrington rotation; (3) standard zonal pB average values for each day; and (4) autocorrelation estimates of pB variation for equatorial and high latitude structure and an autocorrelation coefficient for an amplitude-independent, first moment of the pB distribution. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-34335*# Christopher Newport Coll., Newport News, Va. Dept. of Chemistry.
THEORETICAL STUDIES OF RADIATION EFFECTS IN COMPOSITE MATERIALS FOR SPACE USE Final Report
C. Ken Chang and Efstathios Kamaratos Washington NASA Sep. 1982 40 p refs
(Grant NsG-1614)
(NASA-CR-3618; NAS 1.26:3618) Avail: NTIS HC A03/MF A01 CSCL 11D

Tetraglycidyl 4,4'-diamino diphenyl methane epoxy cured with diamino diphenyl sulfone was used as a model compound. Computer programs were developed to calculate (1) energy deposition coefficients of protons and electrons of various energies at different depths of the material; (2) ranges of protons and electrons of various energies in the material; and (3) cumulative doses received by the composite in different geometric shapes placed in orbits of various altitudes and inclination. A preliminary study on accelerated testing was conducted and it was found that, an elliptical equitorial orbit of 300 km perigee by 2750 km apogee can accumulate, in 2 years or less, enough radiation dose comparable to geosynchronous environment for 30 years. The local plasma model calculated the mean excitation energies for covalent and ionic compounds. Longitudinal and lateral distributions of excited species by electron and proton impact as well as the probability of overlapping of two tracks due to two charged particles within various time intervals were studied. A.R.H.

99 GENERAL

N82-34336# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 11 Monthly Report
Judith Nagle-Eshleman, ed. Nov. 1981 92 p refs
(AD-A108209) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C, 20375 CSCL 20/11

Literature and book reviews, seminar announcements, and a bibliography covering sound, shock, and vibration technology are presented. For individual titles, see N82-34337 through N82-34338.

N82-34337# Open Univ., Milton (England).
SOUND ATTENUATION OVER GROUND COVER 3 **c71**
K. Attenborough *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 13, No. 11 Nov. 1981 p 3-6 refs (For primary document see N82-34336 24-99)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/1

Developments in predicting noise from surface transport sources are reviewed taking into account ground effects and the presence of purpose-built noise barriers. Mechanisms of sound attenuation in forests are outlined and developments in the measurement of acoustic properties of the ground are discussed. Finally, useful directions for further work are proposed. M.G.

N82-34338# Maryland Univ., College Park. Dept. of Mechanical Engineering.
VORTEX SHEDDING FROM CYLINDERS AND THE RESULTING UNSTEADY FORCES AND FLOW PHENOMENON, PART 1 **c71**
S. T. Fleischmann and D. W. Sallet *In* Shock and Vibration Inform. Center The Shock and Vibration Digest, Vol. 13, No. 11 Nov.

1981 p 9-22 refs (For primary document see N82-34336 24-99) Avail: SVIC, Code 5804, Naval Research Lab., Washington D.C. 20375 CSCL 20/1

The unsteady flow phenomena that occur on and near cyliners in cross flow and that are related to vortex shedding are reviewed. An introduction to the phenomenon of vortex shedding from cylinders and the Karman vortex street is provided. The relation between the formation of the vortex street and the forces on the cylinder is discussed, as are the flow regimes of vortex shedding from stationary, circular cylinders. A flow regime is defined as a Reynolds number range that is characterized by a particular experimentally obtained relationship of the Strouhal number to the Reynolds number. M.G.

N82-34339# Office of the Deputy Secretary of Defense, Washington, D. C.

THE DEPARTMENT OF DEFENSE STATEMENT ON THE SCIENCE AND TECHNOLOGY PROGRAM BY MR. H. MARK GROVE, ASSISTANT DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ADVANCED TECHNOLOGY BEFORE THE DEFENSE SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS OF THE UNITED STATES HOUSE OF REPRESENTATIVES, 97TH CONGRESS, SECOND SESSION

H. Mark Grove 16 Jun. 1982 48 p

(AD-A116788) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report discusses the following selected major FY 1983 technical programs: Research, Directed Energy, Very High Speed Integrated Circuits, Embedded Computer Software Technology, Chemical Warfare, Advanced Aircraft Technology, Aircraft Propulsion Technology, Materials and Structures, Underseas Warfare Weaponry Technology, Electro-Magnetic Propulsion, Training and Personnel System Research, Medical and Life Sciences, Undersea Target Surveillance, Electronic Warfare, and Adverse Weather Precision Guided Munitions. GRA

N82-34340# Southeastern Center for Electrical Engineering Education, Inc., St. Cloud, Fla.

USAF SUMMER FACULTY RESEARCH PROGRAM. VOLUME 1: 1981 RESEARCH REPORTS Final Report

Warren D. Peele Oct. 1981 1409 p refs 2 Vol.

(Contract F49620-79-C-0038; AF Proj. 2305)

(AD-A113708; AFOSR-82-0227TR-Vol-1) Avail: NTIS HC A99/MF A01 CSCL 05/1

The United States Air Force Summer Faculty Research Program (USAF-SFRP) is a program designed to introduce university, college, and technical institute faculty members to Air Force research. This is accomplished by the faculty members being selected on a nationally advertised competitive basis for a ten week assignment during the summer intercession to perform research at Air force Laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the faculty member and the Air Force. In addition to compensation and travel expenses, a cost of living allowance is also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research/Air Force Systems Command, United States Air Force, and is conducted by the Southwestern Center for Electrical Engineering Education, Inc. This volume contains 41 papers, with abstracts. GRA

N82-34341# Southeastern Center for Electrical Engineering Education, Inc., St. Cloud, Fla.

USAF SUMMER FACULTY RESEARCH PROGRAM. VOLUME 2: 1981 RESEARCH REPORTS Final Report

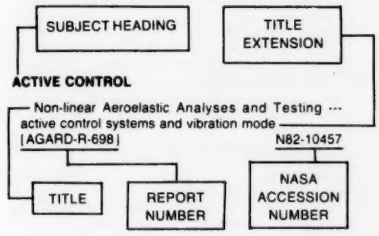
Warren D. Peele Oct. 1981 1330 p refs 2 Vol.

(Contract F49620-79-C-0038; AF Proj. 2305)

(AD-A113709; AFOSR-82-0228TR-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 05/1

The United States Air Force Summer Faculty Research Program (USAF-SFRP) is a program designed to introduce university, college, and technical institute faculty members to Air Force research. This is accomplished by the faculty members being selected on a nationally advertised competitive basis for a ten week assignment during the summer intercession to perform research at Air Force Laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the faculty member and the Air Force. In addition to compensation and travel expenses, a cost of living allowance is also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research/Air Force Systems Command, United States Air Force, and is conducted by the Southeastern Center for Electrical Engineering Education, Inc. This volume contains 45 papers, with abstracts. GRA

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

ABILITIES
On the modelling of creative behavior
[AD-A116896] N82-34027
Assessment and development of oculomotor flying skills by the application of the channel theory of vision
[AD-A115325] N82-34035
Levels of steering control: Reproduction of steering-wheel movements N82-34071

ABSORPTION
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-009398] N82-33842

ABSORPTION SPECTRA
Research on fire-resistant diesel fuel
[AD-A117408] N82-33550
Structural changes in plasma membrane under influence of ionizing radiation N82-33993

ABSORPTION SPECTROSCOPY
Investigations into a more general solution to the problem of matrix interferences in combined atomizer atomic absorption spectrometry N82-33454

ABSORPTIVITY
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic paricles
[NASA-CR-169416] N82-34197

ACCELERATED LIFE TESTS
Accelerated fatigue durability of a high performance composite
[NASA-CR-166407] N82-33437

ACCELERATION PROTECTION
Research on the development of a statistical impact acceleration injury prediction model from -G(x) accelerator runs
[AD-A116440] N82-34003

ACCELERATION STRESSES (PHYSIOLOGY)
Responses to harmonic acceleration with varying head positions
[AD-A114736] N82-34010
A performance analysis study of a complex G field experiment N82-34056

ACCIDENT PREVENTION
Aircraft alerting systems standardization study. Phase 4: Accident implications on systems design
[AD-A117876] N82-33388

ACCURACY
In-situ measurement of particulate in turbulent duct flows
[DE82-010291] N82-33671

ACETYLENE
Acetylene terminated sulfone resin development
[AD-A117243] N82-33531

ACID RAIN
Acid rain
[GPO-87-365] N82-33889

ACIDOSIS
Respiratory adaptation to acute metabolic acidosis in goats with ablated carotid bodies
[AD-A116657] N82-33984

ACOUSTIC ATTENUATION
Sound attenuation over ground cover 3 N82-34337

ACOUSTIC DELAY LINES
Measured performance of a delay lock tracking loop when noise power exceeds signal power
[AD-A116797] N82-33606

ACOUSTIC DUCTS
Circumferentially segmented duct lines optimized for axisymmetric and standing wave sources --- reducing noise from turbofan engines galerkin method acoustic attenuation
[NASA-TP-2075] N82-34190

ACOUSTIC EMISSION
A spectrum analyser for acoustic emission
[AD-A117720] N82-33690

ACOUSTIC IMPEDANCE
The Shock and Vibration Digest, volume 14, no. 2
[AD-A111521] N82-33564
Acoustic impedance measurement methods N82-33565

ACOUSTIC LEVITATION
Containerless processing technology analysis
[NASA-CR-170624] N82-33430

ACOUSTIC MEASUREMENT
Compressibility of colloids. 1: Compressibility studies of aqueous solutions of amphibilic polymers and their adsorbed state on Polystyrne latex dispersions by ultrasonic velocity measurements
[AD-A117416] N82-33538
A spectrum analyser for acoustic emission
[AD-A117720] N82-33690
Engineering geology and geomorphology of streambank erosion. Report 3: The application of waterborne geophysical techniques in fluvial environments
[AD-A115678] N82-33892
Broad band sound from wind turbine generators
[NASA-CR-165810] N82-34187

ACOUSTIC SCATTERING
Approximate theory for the transverse motion of a two-layered plate. A theoretical model applicable to acoustic scattering from submerged structures with coating layer(s)
[AD-A117034] N82-33767

ACOUSTIC SOUNDING
Engineering geology and geomorphology of streambank erosion. Report 3: The application of waterborne geophysical techniques in fluvial environments
[AD-A115678] N82-33892

ACOUSTICS
The literature of vibration engineering N82-33562
Ensemble averaging of acoustic data N82-34102
The Shock and Vibration Digest, volume 13, no. 11
[AD-A108209] N82-34336

ACRYLATES
Ultraviolet-radiation-curable paints
[DE82-015717] N82-33545

ACTIVATED CARBON
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893

ADAPTATION
Respiratory adaptation to acute metabolic acidosis in goats with ablated carotid bodies
[AD-A116657] N82-33984

ADAPTIVE CONTROL
Estimates of crustal transmission losses using MLM array processing
[AD-A117278] N82-33929
Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-34067
Practical methods for the compensation and control of multivariable systems
[AD-A117728] N82-34133
Stochastic and adaptive systems
[AD-A117029] N82-34182

ADAPTIVE FILTERS
On the adaptive implementation of Pisarenko's harmonic retrieval method
[AD-A116003] N82-33600

ADDITIVES
Influence of sulfation-enhanced salt additives on the corrosion behavior of materials in atmospheric fluidized-bed combustors
[DE82-010204] N82-33670

ADHESIVE BONDING
LARC-TPI: A multi-purpose thermoplastic polyimide
[NASA-TM-84516] N82-33530
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium
[AD-A117814] N82-33541
Design methodology for bonded-bolted composite joints. Volume 1: Analysis derivations and illustrative solutions
[AD-A117342] N82-33713
Characterization of adhesively bonded aluminum armor through qualitative analytical techniques
[AD-A117710] N82-33784

ADHESIVES
Mechanical properties of E293/1581 fiberglass-epoxy composite and several adhesive systems
[AD-A117902] N82-33442
Improved damage tolerance of titanium by adhesive lamination
[NASA-TM-84525] N82-33737

ADIABATIC FLOW
Stirling engine with one adiabatic cylinder
[DE82-009606] N82-33849

ADSORPTION
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472
Dissociative adsorption of CO2 on oxidized and reduced Pt/TiO2
[AD-A117890] N82-33473
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium
[AD-A117814] N82-33541

ADVECTION
Forecasting heavy snow at Wenatchee, Washington
[PB82-177783] N82-33960

AEOLIAN TONES
Activities in planetary geology for the physical and earth sciences
[NASA-EP-179] N82-33789

AERATION
Aeration-agitation control based on a mathematical model of the fermentation process
[NRC/CNR-TT-2029] N82-33461

AERIAL PHOTOGRAPHY
Registration of digitized aerial photography with a digital map data base
[AD-A117510] N82-33803

AERIAL RECONNAISSANCE
Airborne gamma-ray spectrometer and magnetometer survey: Alturas Quadrangle, California
[DE82-005539] N82-33805
Aeromagnetic detection and definition of seamounts
[AD-A117153] N82-33971

AEROACOUSTICS
Noise measurement in wind tunnels, workshop summary
[NASA-TM-84219] N82-34188

AEROBES
Technique for the aerobic cultivation of microorganisms in water-in-oil emulsions
[NRC/CNR-TT-2031] N82-33980
AERODYNAMIC CHARACTERISTICS
User's manual for interfacing a leading edge, vortex rollup program with two linear panel methods
[NASA-TM-78584] N82-33340
Computations of projectile Magnus effect at transonic velocities
[AD-A117313] N82-33353
Navier-Stokes computations for conventional and hollow projectile shapes at transonic velocities
[AD-A116866] N82-33355
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357
A simulation language approach to structural interaction problems N82-33758
AERODYNAMIC COEFFICIENTS
Aerodynamic loads on a ball-obturated tubular projectile
[AD-A115756] N82-33349
AERODYNAMIC FORCES
Wind-tunnel drag measurements of a ball-obturated tubular projectile
[AD-A117268] N82-33351
AERODYNAMIC LOADS
Aerodynamic loads on a ball-obturated tubular projectile
[AD-A115756] N82-33349
On the road performance tests of electric test vehicle for correlation with road load simulator
[NASA-TM-82900] N82-33829
AERODYNAMICS
Computational aerodynamics and design
[NASA-TM-84257] N82-33348
AEROELASTICITY
Results of buffet tests in a cryogenic wind tunnel
[NASA-TM-84520] N82-33342
AERONAUTICAL ENGINEERING
Computational aerodynamics and design
[NASA-TM-84257] N82-33348
USAF Summer Faculty Research Program. Volume 1: 1981 research reports
[AD-A113708] N82-34340
USAF Summer Faculty Research Program. Volume 2: 1981 research reports
[AD-A113709] N82-34341
AEROSOLS
In-situ measurement of particulate in turbulent duct flows
[DE82-010291] N82-33671
Beta experiment flight report
[NASA-CR-170622] N82-33698
Beta experiment
[NASA-CR-162087] N82-33699
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899
Guidelines for the determination of atmospheric conditions of oil mists
[PB82-174251] N82-33908
Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary
[AD-A116794] N82-33925
AVHRR measurements of atmospheric aerosols over oceans
[PB82-172115] N82-33945
Factors relating surface visibility to the total optical depth in the marine regime
[AD-A117836] N82-34232
Light scattering calculations for the nephelometer experiment on the 1981/1982 Jupiter Orbiter-Probe mission
[NASA-CR-169418] N82-34323
AEROSPACE MEDICINE
Aerospace medicine and biology. A continuing bibliography with indexes, supplement 235, August 1982
[NASA-SP-7011(235)] N82-33995
Mission operation report. Space Shuttle program: STS-4 postflight medical operations report
[NASA-TM-84854] N82-34001
AFTERBURNING
Augmentor stability management program
[AD-A117926] N82-33428
AGGLOMERATION
Spherical agglomeration of flocculated precipitate
[NRC/CNR-TT-2024] N82-33462
AGING (MATERIALS)
Age dependent minimal repair
[AD-A116846] N82-33336
Hygrothermal effects on the micromechanisms of crack extension in glass fibre and carbon fibre composites
[PB82-176728] N82-33447
The strength of weathered window glass using surface characteristics
[PB82-172735] N82-33546
AGITATION
Aeration-agitation control based on a mathematical model of the fermentation process
[NRC/CNR-TT-2029] N82-33461
AGRICULTURE
Preliminary design and economic investigations of Diffuser Augmented Wind Tubines (DAWT)
[DE82-008475] N82-33854
USSR Report: Life sciences. Biomedical and behavioral sciences
[JPRS-81775] N82-33988
AIR
Determination of carbon monoxide in air by triple quadrupole mass spectrometry
[AD-A117443] N82-33470
AIR BREATHING ENGINES
AFOSR Research Meeting on Diagnostics of Reacting Flow
[AD-A117075] N82-33668
AIR FLOW
Guidelines for siting WECS relative to small-scale terrain features
[DE82-009124] N82-33847
AIR JETS
Containerless processing technology analysis
[NASA-CR-170624] N82-33430
Sphere forming method and apparatus
[NASA-CASE-NPO-15070-1] N82-33567
AIR LAUNCHING
Investigation into Air Launch Cruise Missile (ALCM) flight information loading and display techniques during flex targeting procedure
[AD-A115744] N82-33376
Overview of the aerothermal environment of air-launched missiles
[AD-A116799] N82-33924
AIR NAVIGATION
Terrain following/terrain avoidance system concept development N82-33363
AIR POLLUTION
Study of atmospheric diffusion using LANDSAT
[NASA-CR-169325] N82-33794
Acid rain
[GPO-87-365] N82-33889
Nitrogen oxide transformations in power-plant plumes
[DE82-901847] N82-33897
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes
[DE82-903730] N82-33898
Potential health and environmental effects of light-duty diesel vehicles, 2
[DE82-014390] N82-33901
Indoor pollutants
[PB82-180563] N82-33904
Guidelines for the determination of atmospheric conditions of oil mists
[PB82-174251] N82-33908
Air quality trends in Region 8, 1980 data
[PB82-204074] N82-33910
Air pollutant production by algal cell cultures
[NASA-CR-166384] N82-34076
AIR QUALITY
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
Nitrogen oxide transformations in power-plant plumes
[DE82-901847] N82-33897
Air quality trends in Region 8, 1980 data
[PB82-204074] N82-33910
AIR TRAFFIC
Separation monitoring with four types of predictors on a cockpit display of traffic information N82-34063
AIR TRAFFIC CONTROL
TRACALS evaluation report. Special report: A procedure for RTT position improvement using linear regression analysis of glide slope structure
[AD-A115926] N82-33365
A safety appraisal of the air traffic control system
[AD-A115743] N82-33366
Study of the frequency assignment congestion in the ultra high frequency air traffic control air/ground communication band
[AD-A117640] N82-33368
Preliminary analysis of the benefits and costs to implement the National Airspace System Plan
[AD-A117664] N82-33369
Improving conflict alert performance using moving target detector data
[AD-A117691] N82-33370
FAA air traffic activity, FY 1981
[PB82-200361] N82-33371
Memory and computational requirements for tracking in the advanced computer system
[AD-A117666] N82-33619
Evaluation of four-color plan view display console
[AD-A117897] N82-34085
AIRBORNE/SPACEBORNE COMPUTERS
Weapon system software acquisition and support: A theory of system structure and behavior
[AD-A115555] N82-34103
AIRCRAFT ACCIDENTS
Aircraft alerting systems standardization study. Phase 4: Accident implications on systems design
[AD-A117876] N82-33388
AIRCRAFT CARRIERS
Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-34060
AIRCRAFT COMPARTMENTS
Examination of aircraft interior emergency lighting in a postcrash fire environment
[AD-A117629] N82-33360
Dayton aircraft cabin fire model, version 3. Volume 1: Physical description
[AD-A117905] N82-33361
AIRCRAFT CONFIGURATIONS
Family of airfoil shapes for rotating blades --- for increased power efficiency and blade stability
[NASA-CASE-LAR-12843-1] N82-33372
AIRCRAFT CONSTRUCTION MATERIALS
Development of tough, moisture resistant laminating resins
[NASA-CR-3615] N82-33432
Composite structural materials
[NASA-CR-169345] N82-33434
Waterborne polymeric films
[AD-A116857] N82-33532
AIRCRAFT CONTROL
Reflections on an F-43 in flight emergency
[AD-A116873] N82-33358
Pilot model hypothesis testing N82-34047
AIRCRAFT DESIGN
Recent progress in VSTOL technology
[NASA-TM-84238] N82-33334
Computational aerodynamics and design
[NASA-TM-84257] N82-33348
AIRCRAFT DETECTION
Study of an automatic trajectory following control system
[NASA-CR-169361] N82-33399
AIRCRAFT ENGINES
Survey and update of F-14A mission profiles for TF30 engine usage
[AD-A116831] N82-33337
Advanced turboprop testbed systems study
[NASA-CR-167895] N82-33375
Structural tailoring of engine blades (STAEBL)
[NASA-CR-167949] N82-33391
Exhaust emissions reduction for intermittent combustion aircraft engines
[NASA-CR-167914] N82-33392
Energy efficient engine: Turbine transition duct model technology report
[NASA-CR-167996] N82-33394
Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs and improve readiness
[AD-A117935] N82-34296
AIRCRAFT FUELS
Impact of advanced propeller technology on aircraft/mission characteristics of several general aviation aircraft
[NASA-CR-167984] N82-33347
AIRCRAFT GUIDANCE
Terrain following/terrain avoidance system concept development N82-33363
AIRCRAFT HAZARDS
Examination of aircraft interior emergency lighting in a postcrash fire environment
[AD-A117629] N82-33360
Dayton aircraft cabin fire model, version 3. Volume 1: Physical description
[AD-A117905] N82-33361
AIRCRAFT LANDING
TRACALS evaluation report. Special report: A procedure for RTT position improvement using linear regression analysis of glide slope structure
[AD-A115926] N82-33365
Assessment and development of oculomotor flying skills by the application of the channel theory of vision
[AD-A115325] N82-34035
The effect of visual information on the manual approach and landing N82-34041
Training aircraft design considerations based on the successive organization of perception in manual control N82-34043

Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities N82-34052
Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-34060
Application of a pilot control strategy identification technique to a joint FAA/NASA ground-based simulation of head-up displays for CTOL aircraft N82-34061
PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066

AIRCRAFT MAINTENANCE
Survey and update of F-14A mission profiles for TF30 engine usage
[AD-A116831] N82-33337
Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs and improve readiness
[AD-A117935] N82-34296

AIRCRAFT MANEUVERS
Fatigue behaviour of advanced structural aluminium alloy 74575-T761 --- for aircraft construction
[TAE-447] N82-33492
Visual/motion cue mismatch during a coordinated roll maneuver N82-34055

AIRCRAFT NOISE
Noise measurement in wind tunnels, workshop summary
[NASA-TM-84219] N82-34188
Supersonic jet noise generated by large scale instabilities
[NASA-TP-2072] N82-34189

AIRCRAFT PERFORMANCE
A model-based technique for predicting pilot opinion ratings for large commercial transports N82-34050
An analytical prediction of pilot ratings utilizing human pilot model N82-34051
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities N82-34052
Pilot opinions of sampling effects in lateral-directional control N82-34053

AIRCRAFT PILOTS
The effects of pilot experience of acquiring instrument flight skills, phase 2
[AD-A113576] N82-34033
A comprehensive system model for motion/space sickness. Preliminary results N82-34059

AIRCRAFT SAFETY
A safety appraisal of the air traffic control system
[AD-A115743] N82-33366
FAA air traffic activity, FY 1981
[PB82-200361] N82-33371

AIRCRAFT STABILITY
Curved flow wind tunnnel test of F-18 aircraft
[NASA-CR-169345] N82-33339

AIRFOIL PROFILES
Family of airfoil shapes for rotating blades --- for increased power efficiency and blade stability
[NASA-CASE-LAR-12843-1] N82-33372

AIRFRAMES
Crashworthy airframe design concepts: Fabrication and testing
[NASA-CR-3603] N82-33735

AIRLINE OPERATIONS
FAA air traffic activity, FY 1981
[PB82-200361] N82-33371

AIRPORTS
Preliminary analysis of the benefits and costs to implement the National Airspace System Plan
[AD-A117664] N82-33369

AIRSPACE
Northeast corridor helicopter area navigation accuracy evaluation
[AD-A117445] N82-33367
Preliminary analysis of the benefits and costs to implement the National Airspace System Plan
[AD-A117664] N82-33369
Examination of the Federal Aviation Administration's plan for the National Airspace System
[AFMD-82-66] N82-33403

ALASKA
Sea ice rubble formations in the Bering Sea and Norton Sound, Alaska
[AD-A113773] N82-33801

ALBEDO
A tutorial solution to scattering of radiation in a thin atmosphere bounded below by a diffusely reflecting, absorbing surface
[NASA-TP-2077] N82-33918

ALCOHOLS
Theoretical and practical considerations of some aspects of gas chromatographic optimization N82-33453

ALDOSTERONE
Acute albumin-induced plasma volume expansion and exercise in the heat: Effects on hormonal responses in men
[AD-A115180] N82-34017

ALERTNESS
A pilot study of human factors in SAR
[AD-A117917] N82-34087

ALGORITHMS
Improving conflict alert performance using moving target detector data
[AD-A117691] N82-33370
Enhancements and algorithms for avionic information processing system design methodology
[AD-A117948] N82-33385
The problem of ensuring a specified molecular weight in the process of emulsion polymerization
[NRC/CNR-TT-2026] N82-33529
On the adaptive implementation of Pisarenko's harmonic retrieval method
[AD-A116003] N82-33600
Real-time control of GMA welding
[PB82-204660] N82-33721
A semi-implicit dynamic relaxation algorithm for static nonlinear structural analysis N82-33740
Minimization versus homotopy algorithms N82-33741
System identification: A question of uniqueness, revisited N82-33763
A computer package for the design and eigenproblem solution of damped linear multidegree of freedom systems N82-33764
An analysis of the max-min texture measure
[AD-A116768] N82-33799
The roughness lengths associated with regions of heterogeneous vegetation and elevation
[AD-A117409] N82-33802
Measuring the fracture dimensions of empirical cartographic curves
[AD-A117498] N82-33804
NECAP 4.1: NASA's Energy Cost Analysis Program engineering manual
[NASA-TM-83240] N82-33825
NECAP 4.1: NASA's Energy Cost Analysis Program engineering flow chart
[NASA-TM-83242] N82-33826
Numerical analysis of hydraulically-driven fractures
[DE82-015501] N82-33939
A computer aided workstation assesor for crew operations - WOSTAS
[AD-A116045] N82-34079
Octree generation, analysis and manipulation
[AD-A117450] N82-34112
Storage-efficient method for construction of a Thiessen triangulation
[DE82-014571] N82-34117
Optimization algorithms on random graphs
[AD-A115804] N82-34140
A Toeplitz Gram-Schmidt algorithm for autoregressive modeling
[AD-A117071] N82-34145
Distributed minimum hop algorithms
[AD-A117808] N82-34151
Performance bounds for binary testing with arbitrary weights
[AD-A117493] N82-34154
Extrapolation algorithms and their use for the evaluation of beam-beam effects on the motion and polarization of particles in storage rings
[DE82-011425] N82-34203

ALKENES
Moessbauer spectroscopic and related characterization of Fischer-Tropsch catalysts
[DE82-009280] N82-33476

ALKYL COMPOUNDS
Metal alkoxides: Models for metal oxides
[AD-A117947] N82-33503

ALKYNES
High performance channel injection sealant invention abstract
[NASA-CASE-ARC-14408-1] N82-33523

ALLOTROPY
A primer on sulfur for the planetary geologist
[NASA-CR-3594] N82-33459

ALLOYS
Stress corrosion characterization of turbine rotor materials, phase 1
[DE82-902070] N82-33508
Review of recent irradiation-creep results
[DE82-014570] N82-33512

ALTITUDE
Oxygen transport to human tissues
[AD-A115904] N82-34007

ALUMINATES
Thermal fatigue behavior of FP alumina/magnesium composites
[AD-A117292] N82-33440

ALUMINUM
The behaviour of Al electrodes in aqueous solutions
[NDRE/PUBL-81/1003] N82-33460
Blended elemental titanium alloys
[DE82-012882] N82-33513
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium
[AD-A117814] N82-33541
Characterization of adhesively bonded aluminum armor through qualitative analytical techniques
[AD-A117710] N82-33784
Study of the fundamental thermal-management aspects of the lithium-aluminium/iron sulfide battery
[DE82-014441] N82-33871
Five OTEC biofouling and corrosion experiments at Keahole Point, 1976 to 1980
[DE82-008086] N82-33987

ALUMINUM ALLOYS
Fatigue behaviour of advanced structural aluminium alloy 74575-T761 --- for aircraft construction
[TAE-447] N82-33492
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501
Modelling of deformation and fracture in high-temperature structural materials
[DE82-013040] N82-33511
The fatigue notch factor revisited
[TAE-446] N82-33732

ALUMINUM OXIDES
Aluminum/cuprous oxide thermite
[DE82-012866] N82-33514
Practical applications of hot-isostatic pressing diagrams: Four case studies
[PB82-182338] N82-33574
Resolution of factors responsible for difficulty in growing single crystals of YAG
[AD-A117401] N82-34279

AMBIENT TEMPERATURE
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865

AMIDES
Research on fire-resistant diesel fuel
[AD-A117408] N82-33550

AMINES
Synthesis and characterization of new insensitive high energy polynitramine compound, 2,4,8,10-tetranitro-2,4,8,10-tetraazaspiro (5.5) undecane (TNSU)
[AD-A116832] N82-33533

AMMETERS
Voltammetric studies of a multipurpose membrane electrode N82-33455

AMMONIA
Conversion of ammonia plants to methanol production
[PB82-177494] N82-33489
Reference book for the nitrogen industry worker in two volumes, volume 1
[AD-A115651] N82-33569

AMMUNITION
Explosives instrumentation group trial 6/77-propellant fire trials (series 2)
[AD-A117695] N82-33555

AMORPHOUS MATERIALS
Preparation and characterization of amorphous ZnAs for use in solar cells
[DE82-014516] N82-33867
A program of research on microfabrication techniques for VLSI magnetic devices
[AD-A117922] N82-34281

AMPHIBIOUS VEHICLES
Lift system and fan performance of air cushion supported vehicles
[AD-A117363] N82-33570

AMPLITUDES
Investigation of the Rayleigh critical angle phenomenon for the characterization of surface properties
[AD-A117264] N82-33723

ANAEROBES
Biomass production, anaerobic digestion, and nutrient recycling of small benthic or floating seaweeds
[DE82-009172] N82-33843

ANALOG CIRCUITS
A SPICE2 model for the M732 analog timer integrated circuit
[AD-A117012] N82-33643
Fault diagnosis of nonlinear analog circuits. Volume 1. DC diagnosis of hard failures
[AD-A117567] N82-33645

ANALYSIS OF VARIANCE
Logarithmic derivatives of two normalizing functions
[AD-A117516] N82-34180

ANALYTICAL CHEMISTRY
Metal alkoxides: Models for metal oxides
[AD-A117947] N82-33503

ANATASE
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472
ANATOMY
A dynamic model of the cervical spine and head
[AD-A114867] N82-34008
ANDES MOUNTAINS (SOUTH AMERICA)
Overseas Geology and Mineral Resources, number 55. Outline of the geology of Ecuador
[PB82-172784] N82-33815
Geologic evolution of the Cordilliera Darwin orogenic core complex, Southern Andes N82-33917
ANEMOMETERS
Analysis of a kite anemometer
[DE82-009058] N82-33691
ANGLE OF ATTACK
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[NASA-TM-83276] N82-33736
ANGLES (GEOMETRY)
Investigation of the Rayleigh critical angle phenomenon for the characterization of surface properties
[AD-A117264] N82-33723
ANGULAR MOMENTUM
Simple way of solving the hydrogen atom problem
[DE82-700020] N82-34204
ANIMALS
An automated optical display system for visual physiology experiments
[AD-A116499] N82-34004
ANIONS
BNL neutral-beam development group
[DE82-003852] N82-34266
ANISOTROPY
Multi-ion interactions and defects in metals
[AD-A117451] N82-33502
ANNEALING
Growth of HgCdTe by modified molecular beam epitaxy
[AD-A117752] N82-34199
Radiation damage and annealing effects studies of silicon-implanted gallium arsenide
[AD-A117884] N82-34284
ANNULAR FLOW
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672
ANNULI
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672
ANODES
Calcium inorganic electrolyte battery development
[AD-A115956] N82-33831
ANTENNA ARRAYS
Method and apparatus for self-calibration and phasing of array antenna
[NASA-CASE-NPO-15920-1] N82-33593
Design of microstrip linear array antennas by computer
[AD-A117399] N82-33620
ANTENNA DESIGN
Design of microstrip linear array antennas by computer
[AD-A117399] N82-33620
Responses of FM/CW systems having filters
[AD-A117400] N82-33621
ANTENNA FEEDS
Method and apparatus for self-calibration and phasing of array antenna
[NASA-CASE-NPO-15920-1] N82-33593
ANTENNA RADIATION PATTERNS
Method and apparatus for self-calibration and phasing of array antenna
[NASA-CASE-NPO-15920-1] N82-33593
An iterative phase-only nulling method
[AD-A116949] N82-33604
Dielectric waveguide antenna
[AD-A117305] N82-33609
ANTENNAS
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-169419] N82-33422
ANTIBIOTICS
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994
ANTICLINES
Preliminary study of in-situ combustion in diatomites
[DE82-013272] N82-33862
ANXIETY
Stress, anxiety, and cognitive interference: Reactions to tests
[AD-A113564] N82-34031
APPALACHIAN MOUNTAINS (NORTH AMERICA)
The comparative sedimentology of the Bahama type shelf carbonates of the middle Ordovician St. Paul group of the central Appalachians N82-33915
APPROACH
Training aircraft design considerations based on the successive organization of perception in manual control N82-34043
PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066
APPROACH CONTROL
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities N82-34052
APPROPRIATIONS
Making appropriations for the National Aeronautics and Space Administration
[H-REPT-97-897] N82-34308
APPROXIMATION
Newton's method
[DE82-013692] N82-34134
Variational analysis and approximate solutions for transport phenomena
[AD-A117110] N82-34147
A simple quadrature formula from Simpson's rule applicable for odd or even n
[AD-A116867] N82-34148
Performance bounds for binary testing with arbitrary weights
[AD-A117493] N82-34154
Optimal grouping, spacing, stratification and piecewise constant approximation
[AD-A117023] N82-34168
AQUEOUS SOLUTIONS
The behaviour of Al electrodes in aqueous solutions
[NDRE/PUBL-81/1003] N82-33460
Spherical agglomeration of flocculated precipitate
[NRC/CNR-TT-2024] N82-33462
The interaction of manganese(II) with the surface of calcite in dilute solutions and seawater
[DE82-011104] N82-33475
Waterborne polymeric films
[AD-A116857] N82-33532
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A117080] N82-33549
Anomalous reorganization free energies in optical electron transfer in solution
[AD-A117680] N82-34202
AQUIFERS
Flow characteristics in geopressured zones and salt water aquifers
[PB82-181280] N82-33807
ARC SPRAYING
Arc-sprayed metals for structural electromagnetic shielding
[AD-A117673] N82-33629
ARCHITECTURE
Some practical aspects on the infra-red thermography of buildings
[PB82-174517] N82-33576
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory
[DE82-010867] N82-33866
ARCHITECTURE (COMPUTERS)
the finite element machine: An experiment in parallel processing N82-33752
Data flow computer architecture
[DE82-014632] N82-34098
An architecture for database management standards
[PB82-176322] N82-34099
Cellular architectures for pattern recognition
[AD-A117049] N82-34110
ARCTIC OCEAN
NORSEX 1979 microwave remote sensing data report
[NASA-CR-165967] N82-33796
ARCTIC REGIONS
Part 1: Ancient arctic ice does not contain large excesses of natural lead. Part 2: Chronological variations in lead and barium concentrations and lead isotopic compositions in sediments of four southern California off-shore basins N82-33791
AREA
Evaluation of spatial filtering on the accuracy of wheat area estimate
[E82-10292] N82-33792
AREA NAVIGATION
Northeast corridor helicopter area navigation accuracy evaluation
[AD-A117445] N82-33367
ARGON
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-009398] N82-33842
Determination of metastable fraction in an ion beam extracted from ECR plasma
[IPPJ-580] N82-34236
ARMOR
Characterization of adhesively bonded aluminum armor through qualitative analytical techniques
[AD-A117710] N82-33784
AROMATIC COMPOUNDS
Research on fire-resistant diesel fuel
[AD-A117408] N82-33550
ARRAYS
Estimates of crustal transmission losses using MLM array processing
[AD-A117278] N82-33929
ARSENIDES
Preparation and characterization of amorphous ZnAs for use in solar cells
[DE82-014516] N82-33867
ARTERIES
Respiratory adaptation to acute metabolic acidosis in goats with ablated carotid bodies
[AD-A116657] N82-33984
ARTIFICIAL CLOUDS
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 4: FACE-2 microphysical data for analyses of seeded and unseeded cumulus towers
[PB82-172149] N82-33964
ARTIFICIAL INTELLIGENCE
Zero-crossings and spatiotemporal interpolation in vision: Aliasing and electrical coupling between sensors
[AD-A117608] N82-34019
On the modelling of creative behavior
[AD-A116896] N82-34027
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 1: Executive summary
[NASA-CR-162079] N82-34127
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 3: ARAMIS overview
[NASA-CR-162081] N82-34128
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 1: Study results
[NASA-CR-165975] N82-34129
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 2, Part 2: Appendixes B, C, D and E
[NASA-CR-165977] N82-34131
Applications of artificial intelligence in voice recognition systems in micro-computers
[AD-A115735] N82-34132
ARTIFICIAL SATELLITES
Modeling and adjusting global ocean tides using SEASAT altimeter data
[AD-A115841] N82-33972
ARTILLERY
Dictionary of missile and artillery terms
[AD-A115995] N82-33414
Feasibility study: Hollow plastic spheres to increase hydraulic fluid compressibility
[NASA-CR-169374] N82-33539
ASTRONOMICAL CATALOGS
Catalog of infrared observations
[NASA-TM-83819] N82-34319
ASTRONOMICAL PHOTOGRAPHY
Intagliated phosphor screen image tube project
[NASA-CR-170445] N82-33635
ASTRONOMICAL SPECTROSCOPY
Evidence for extended chromospheres surrounding red giant stars
[NASA-CR-169349] N82-34316
Ultraviolet and X-ray detection of the 56 Peg system (KO 2p + WD)
[NASA-CR-169351] N82-34317
ASTROPHYSICS
Evidence for extended chromospheres surrounding red giant stars
[NASA-CR-169349] N82-34316
ASYMMETRY
A theory of the Io phase asymmetry of the Jovian decametric radiation
[NASA-TM-83994] N82-34325
ASYMPTOTIC METHODS
High energy hadron-hadron collisions
[DE82-011255] N82-34206
ASYMPTOTIC SERIES
Asymptotic and numerical methods for vector systems of singularly-perturbed boundary value problems
[AD-A117111] N82-34141

Edgeworth expansions in statistics: A brief review
[AD-A117061] N82-34165

ATLANTIC OCEAN
The marine geology of the Bahama Escarpment
N82-33916
Atlantic coast water-level climate
[AD-A117147] N82-33951
Objective specification of Atlantic Ocean wind fields from historical data
[AD-A117683] N82-33958
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973

ATMOSPHERIC ATTENUATION
An empirical model for near millimeter wave snow extinction and backscatter
[AD-A117350] N82-33610
The mean and variance of skywave radar sea-echo power spectra for discrete ionospheric multipath
[PB82-174236] N82-33631

ATMOSPHERIC CHEMISTRY
Nitrogen oxide transformations in power-plant plumes
[DE82-901847] N82-33897

ATMOSPHERIC COMPOSITION
Beta experiment flight report
[NASA-CR-170622] N82-33698
Beta experiment
[NASA-CR-162087] N82-33699
Measurement of tropospheric carbonyl sulfide by microwave spectrometry
[NASA-CR-169417] N82-33920
Exposure to atmospheric benzene vapour associated with motor gasoline
[PB82-174244] N82-34025

ATMOSPHERIC DIFFUSION
Study of atmospheric diffusion using LANDSAT
[NASA-CR-169325] N82-33794

ATMOSPHERIC EFFECTS
Atmospheric constraint statistics for the Space Shuttle mission planning
[NASA-TP-2069] N82-33417

ATMOSPHERIC ELECTRICITY
Development of a minicomputer atmospheric noise model
[AD-A117851] N82-33936

ATMOSPHERIC MODELS
An empirical model for near millimeter wave snow extinction and backscatter
[AD-A117350] N82-33610
A summary of the results of a study of acoustic bottom interaction in a range dependent environment
[AD-A116891] N82-33970
Factors relating surface visibility to the total optical depth in the marine regime
[AD-A117836] N82-34232

ATMOSPHERIC PHYSICS
The 26th AFOSR chemical and atmospheric sciences program review FY81
[AD-A117325] N82-33930

ATMOSPHERIC REFRACTION
Ray tracing methods for calculation of atmospheric refraction
[AD-A116766] N82-33928

ATMOSPHERIC SCATTERING
Path integral formation of wave propagation in the ionosphere, 4
[AD-A117723] N82-33628
A tutorial solution to scattering of radiation in a thin atmosphere bounded below by a diffusely reflecting, absorbing surface
[NASA-TP-2077] N82-33918

ATMOSPHERIC SOUNDING
High power transportable VLF transmitter facility
[AD-A117419] N82-33623

ATMOSPHERIC TEMPERATURE
Overview of the aerothermal environment of air-launched missiles
[AD-A116799] N82-33924

ATMOSPHERIC TIDES
Lunar variation of several ionospheric parameters
[AD-A117689] N82-33938

ATMOSPHERIC TURBULENCE
Turbulence analysis by use of the fast Fourier transform --- for calculation of impact on missile systems
[AD-A117157] N82-33953

ATOMIC CLOCKS
Prototype design and initial test evaluation of a Global Positioning System Time Transfer Receiver (GPS TTR)
[NASA-TM-84721] N82-33364

ATOMIC COLLISIONS
Determination of metastable fraction in an ion beam extracted from ECR plasma
[IPPJ-580] N82-34236

ATOMIC EXCITATIONS
Pulsed excitation and collisional processes
[AD-A116937] N82-33707

ATOMIC SPECTRA
Investigations into a more general solution to the problem of matrix interferences in combined atomizer atomic absorption spectrometry N82-33454

ATOMIC STRUCTURE
Research on sources of gas phase metastable atoms and molecules
[AD-A117672] N82-34201

ATOMIZING
Investigations into a more general solution to the problem of matrix interferences in combined atomizer atomic absorption spectrometry N82-33454

ATOMS
Triply differential studies of atomic and molecular photoionization using synchrotron radiation
[AD-A117247] N82-34198

ATROPHY
The effect of disuse on fast and slow skeletal muscle
N82-33997

ATTENTION
A model of human decision making in multiple process monitoring situations N82-34065

ATTENUATION
Attenuation of high intensity reradiated light by photochromic glass
[AD-A117424] N82-34227

ATTITUDE CONTROL
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-169419] N82-33422

AUDITORY SIGNALS
Speech Command Auditory Display System (SCADS)
[AD-A117486] N82-33387

AUGMENTATION
Preliminary design and economic investigations of Diffuser Augmented Wind Tubines (DAWT)
[DE82-008475] N82-33854

AURORAS
Electron velocity shear instability in the auroral ionosphere
[AD-A116848] N82-33922
Multichannel VUV rocketborne monochromator for low-level auroral measurements
[AD-A115815] N82-34220

AUTOCORRELATION
Properties of even length Barker codes and specific polyphase codes with Barker type autocorrelation functions
[AD-A117415] N82-33622
The G-spectral estimator
[AD-A116942] N82-34144
Method of moments estimators for the moving average coefficients in an ARMA (p,q) process
[AD-A116943] N82-34171
Autoregressive spectral estimation
[AD-A117266] N82-34174

AUTOMATA THEORY
Constrained multibody system dynamics: An automated approach N82-33762

AUTOMATIC CONTROL
Analysis of several glidepath and speed control autopilot concepts for a powered lift STOL aircraft
[NASA-TM-84282] N82-33400
Device for the control of free-spinning models in a wind tunnel
[AD-A115993] N82-33406
Explosive-powder compaction system
[DE82-003134] N82-33556
Real-time control of GMA welding
[PB82-204660] N82-33721
GMA welding experiments using real-time control
[PB82-204652] N82-33722

AUTOMATIC FLIGHT CONTROL
Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-34060

AUTOMATIC GAIN CONTROL
Voice Interactive Systems Technology Avionics (VISTA) Program
[AD-A117288] N82-33383

AUTOMATIC PILOTS
Analysis of several glidepath and speed control autopilot concepts for a powered lift STOL aircraft
[NASA-TM-84282] N82-33400

AUTOMATIC TEST EQUIPMENT
Device for the control of free-spinning models in a wind tunnel
[AD-A115993] N82-33406
Automatic test methods for linear microcircuits
[AD-A117594] N82-33649

AUTOMOBILE ENGINES
Automotive Stirling Engine Mod 1 Design Review, volume 1
[NASA-CR-167935] N82-34311
Automotive Stirling Engine Mod 1 Design Review, volume 3 --- engineering drawings
[NASA-CR-167397] N82-34312

AUTOMOBILES
Effects of motivation on car-following N82-34070
Levels of steering control: Reproduction of steering-wheel movements N82-34071
Analysis of driver performance under reduced visibility
N82-34075

AUTOREGRESSIVE PROCESSES
Extensions of some models for positive-valued time series
[AD-A115754] N82-34138
Efficient multichannel autoregressive modeling in time and frequency domain
[AD-A115752] N82-34139
A Toeplitz Gram-Schmidt algorithm for autoregressive modeling
[AD-A117071] N82-34145
Time series model identification, spectral estimation and functional inference
[AD-A117073] N82-34146
Quantiles, parametric-select density estimations, and bi-information parameter estimators
[AD-A117460] N82-34153
Method of moments estimators for the moving average coefficients in an ARMA (p,q) process
[AD-A116943] N82-34171
Autoregressive spectral estimation and functional inference
[AD-A117113] N82-34173
Autoregressive spectral estimation
[AD-A117266] N82-34174
Maximum entropy interpretation of autoregressive spectral densities
[AD-A117263] N82-34175
Simultaneous confidence bands for autoregressive spectra
[AD-A117072] N82-34176

AVALANCHES
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981
[PB82-176967] N82-33966

AVERAGE
Extensions of some models for positive-valued time series
[AD-A115754] N82-34138
Efficient multichannel autoregressive modeling in time and frequency domain
[AD-A115752] N82-34139
Method of moments estimators for the moving average coefficients in an ARMA (p,q) process
[AD-A116943] N82-34171

AVIONICS
The AIDS/F-18 diffractive HUD
[AD-A116026] N82-33382
Voice Interactive Systems Technology Avionics (VISTA) Program
[AD-A117288] N82-33383
Development of avionics installation interface standards
[AD-A116853] N82-33384
Enhancements and algorithms for avionic information processing system design methodology
[AD-A117948] N82-33385

AXES OF ROTATION
A finite element approach for shells of revolution with a local deviation N82-33756

AXIAL FLOW
Numerical stability analysis of a compressor model
[AD-A116878] N82-33396

AXIAL FLOW TURBINES
Rotor tip clearance effects on overall and blade-element performance of axial-flow transonic fan stage
[NASA-TP-2049] N82-33389

AXIAL LOADS
Vibrations of axially loaded stiffened cylindrical panels with elastic restraints
[TAE-439] N82-33730

AXISYMMETRIC FLOW
Circumferentially segmented duct lines optimized for axisymmetric and standing wave sources --- reducing noise from turbofan engines galerkin method acoustic attenuation
[NASA-TP-2075] N82-34190

B

BACK INJURIES
A dynamic model of the cervical spine and head
[AD-A114887] N82-34008

BACKSCATTERING
An empirical model for near millimeter wave snow extinction and backscatter
[AD-A117350] N82-33610

Techniques for Doppler spectral estimation of HF radar signals backscattered from high latitude ionosphere irregularities
[AD-A116838] N82-33613
Beta experiment flight report
[NASA-CR-170622] N82-33698
Beta experiment
[NASA-CR-162087] N82-33699
Doppler spectra of sea-surface backscatter at high acoustic frequencies
[AD-A117682] N82-33978

BACTERIOLOGY
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994

BALLOON-BORNE INSTRUMENTS
High power transportable VLF transmitter facility
[AD-A117419] N82-33623

BANDWIDTH
Electron beam generated holographic optical element research
[AD-A117052] N82-33685

BATCH PROCESSING
Glass batch preheater: Phase 2. Laboratory testing
[PB82-180639] N82-33577

BATHYMETERS
Engineering geology and geomorphology of streambank erosion. Report 3: The application of waterborne geophysical techniques in fluvial environments
[AD-A115678] N82-33892
Investigate the time evolution of the correlation between bathymetry and geoid height in the Pacific Ocean
[PB82-172099] N82-33944

BATTERY CHARGERS
Use of the Charge/Discharge (C/D) ratio to aument voltage limit (V sub T) charge control in the ERBS spacecraft
[NASA-TM-83991] N82-33824

BAYES THEOREM
NOMBAS: A Bayesian procedure for selecting the greatest mean
[AD-A117611] N82-34178

BEADS
A study of the nature of solid particle impact and shape on the erosion morphology of ductile metals
[NASA-TM-82933] N82-33493

BEAM INJECTION
Formation of relativistic electron beam rings in a conducting cavity
[IPPJ-583] N82-34237
Evolution of ring current formed by relativistic electron beam injection into a charge but not current neutralizing plasma
[IPPJ-576] N82-34247
Formation of z-discharged plasma channel in LIB-fusion device
[IPPJ-601] N82-34255

BEAM INTERACTIONS
Extrapolation algorithms and their use for the evaluation of beam-beam effects on the motion and polarization of particles in storage rings
[DE82-011425] N82-34203

BEAMS (SUPPORTS)
Recent progress in the dynamic plastic behavior of structures, part 3 N82-33728
Application of a boundary element method to the study of dynamical torsion of beams N82-33747
Durability of reinforced concrete beams exposed to marine environment
[AD-A117284] N82-33768
Durability of post-tensioned concrete beams exposed to severe natural weathering
[AD-A13130] N82-33769
Elastic/plastic finite element analysis of a single edge-cracked beam subjected to mode 1 tensile loading
[AD-A117622] N82-33773
Mechanics of bimodular composite structures
[AD-A117942] N82-33776
Analyses of beams constructed of nonlinear materials having different behavior in tension and compression
[AD-A117944] N82-33777

BEARING ALLOYS
The effect of carbon and boron on the friction behavior of Ti-implanted 52100 bearing steel at low sliding speeds
[AD-A117742] N82-33500

BEARINGS
Engine dynamic analysis with general nonlinear finite element codes. Part 2: Bearing element implementation overall numerical characteristics and benchmaking
[NASA-CR-167944] N82-33390

BEHAVIOR
Dosimetric and behavioral analysis of microwave-drug synergistic effects on operant behavior in the rat
[AD-A115115] N82-33986
On the modelling of creative behavior
[AD-A116896] N82-34027

BENDING
Semirigid coaxial RF cable bending techniques
[DE82-016029] N82-33785

BENDING MOMENTS
Results of buffet tests in a cryogenic wind tunnel
[NASA-TM-84520] N82-33342

BENZENE POISONING
Exposure to atmospheric benzene vapour associated with motor gasoline
[PB82-174244] N82-34025

BERING SEA
Sea ice rubble formations in the Bering Sea and Norton Sound, Alaska
[AD-A113773] N82-33801

BETA PARTICLES
Average beta value of axially symmetric plasma
[IPPJ-586] N82-34252

BETATRONS
Extrapolation algorithms and their use for the evaluation of beam-beam effects on the motion and polarization of particles in storage rings
[DE82-011425] N82-34203

BIBLIOGRAPHIES
Cryogenic wind tunnels: A selected, annotated bibliography
[NASA-TM-84474] N82-33405
Reference book for the nitrogen industry worker in two volumes, volume 1
[AD-A115651] N82-33569
Overseas Geology and Mineral Resources, number 58. An annotated bibliography of Ecuadorian geology
[PB82-172768] N82-33816
Aerospace medicine and biology. A continuing bibliography with indexes, supplement 235, August 1982
[NASA-SP-7011(235)] N82-33995
A bibliography of planetary geology principal investigators and their associates, 1981 - 1982
[NASA-CR-3593] N82-34313
The Shock and Vibration Digest, volume 13, no. 11
[AD-A108209] N82-34336
USAF Summer Faculty Research Program. Volume 1: 1981 research reports
[AD-A113708] N82-34340
USAF Summer Faculty Research Program. Volume 2: 1981 research reports
[AD-A113709] N82-34341

BINARY STARS
Ultraviolet and X-ray detection of the 56 Peg system (KO 2p + WD)
[NASA-CR-169351] N82-34317
The structure, energy balance, and winds of cool stars
[NASA-CR-169356] N82-34318

BINARY SYSTEMS (MATERIALS)
Optical Studies of model binary miscibility gap system
[NASA-TM-82494] N82-33683

BIOACOUSTICS
Variations in noise dosimeter readings of fluctuating noise
[AD-A115763] N82-34002

BIOCHEMISTRY
USSR Report: Life sciences. Biomedical and behavioral sciences
[JPRS-81775] N82-33988
New data on metabolism and action mechanism of mycotoxins N82-33989

BIOCONVERSION
Biomass production, anaerobic digestion, and nutrient recycling of small benthic or floating seaweeds
[DE82-009172] N82-33843

BIODYNAMICS
Investigation of aircrew protection during emergency escape at dynamic pressures up to 1600 Q
[AD-A117552] N82-33359
A dynamic model of the cervical spine and head
[AD-A114887] N82-34008
Dynamic response of vertebral elements response of the intervertebral joint to torsion
[AD-A115125] N82-34016
Biodynamic data bank feasibility study
[AD-A117921] N82-34020
Description/demonstration of BIODYN-80. A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limbs, head and eyes N82-34057
Repeated measures of human performance: A bag of research tools
[AD-A113954] N82-34084

BIOELECTRICITY
Bioelectric fields: Their sources, nature and purpose N82-33991

BIOLOGICAL EFFECTS
A laboratory model for the evaluation of the toxic natures of combustion products
[RAE-TRANS-2083] N82-33464
Potential health and environmental effects of light-duty diesel vehicles, 2
[DE82-014390] N82-33901
Five OTEC biofouling and corrosion experiments at Keahole Point, 1976 to 1980
[DE82-008086] N82-33987
Aerospace medicine and biology. A continuing bibliography with indexes, supplement 235, August 1982
[NASA-SP-7011(235)] N82-33995
Biological Effects of Nonionizing Electromagnetic Radiation: A digest of current literature, July through September 1981, volume 6, number 1
[PB82-176504] N82-34024
Environmental assessment model for shallow land disposal of low-level radioactive wastes
[DE82-001830] N82-34214

BIOLOGY
Terrestrial biological inventory, Hillview Drainage and Levee District, Greene and Scott Counties, Illinois
[AD-A115911] N82-33800
USSR Report: Life sciences. Biomedical and behavioral sciences
[JPRS-81775] N82-33988
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994

BIOMASS ENERGY PRODUCTION
Progress in the entrained-flow, fast-ablative pyrolysis of biomass
[DE82-009911] N82-33478
Advanced bio-energy systems for Air Force installations
[AD-A117084] N82-33835
Biomass production, anaerobic digestion, and nutrient recycling of small benthic or floating seaweeds
[DE82-009172] N82-33843

BIOSYNTHESIS
New data on metabolism and action mechanism of mycotoxins N82-33989

BIOTECHNOLOGY
USSR Report: Life sciences. Biomedical and behavioral sciences
[JPRS-81775] N82-33988
Design of automated systems for control of technological processes in large scale microbiological industry with use of microprocesors N82-33990

BITUMENS
Placement of an experimental heater-scarified in-place recycled pavement
[PB82-197237] N82-33590

BLADE TIPS
Rotor tip clearance effects on overall and blade-element performance of axial-flow transonic fan stage
[NASA-TP-2049] N82-33389
Flow phenomena in compressor casing treatment
[CUED/A-TURBO/TR-112] N82-33661

BLOOD
Photoacoustic spectroscopy at visible and infrared wavelengths N82-33448

BLOOD PLASMA
Mechanisms of change in plasma volume to acute and chronic exercise in man N82-33999
Acute albumin-induced plasma volume expansion and exercise in the heat: Effects on hormonal responses in men
[AD-A115180] N82-34017

BLOOD VOLUME
Mechanisms of change in plasma volume to acute and chronic exercise in man N82-33999

BODY TEMPERATURE
Acute albumin-induced plasma volume expansion and exercise in the heat: Effects on hormonal responses in men
[AD-A115180] N82-34017

BODY WEIGHT
Stimulation of body weight increase and epiphyseal cartilage growth by insulin like growth factor
[NASA-TM-84285] N82-33983

BODY-WING CONFIGURATIONS
Euler solutions of supersonic wing-body interference at high incidence including vortex effects
[NEAR-TR-263] N82-33341
An experimental study of the transonic equivalence rule with lift
[AD-A117019] N82-33350

BOILERS
Development of nondestructive testing technique. Ultrasonic testing and radiographic testing
[DE82-700448] N82-33726

BOLTS
Design methodology for bonded-bolted composite joints. Volume 1: Analysis derivations and illustrative solutions
[AD-A117342] N82-33713
An experimental study of bolted shear connections
[PB82-201518] N82-33788

BONDING
Surface texturing of fluoropolymers
[NASA-CASE-LEW-13028-1] N82-33521
BORON ALLOYS
The effect of carbon and boron on the friction behavior of Ti-implanted 52100 bearing steel at low sliding speeds
[AD-A117742] N82-33500
BORON HYDRIDES
Studies on the syntheses of boron hydride systems
[AD-A115817] N82-33467
BOROSILICATE GLASS
Method for repair of thin glass coatings --- on space shuttle orbiter tiles
[NASA-CASE-KSC-11097-1] N82-33520
BOUNDARY ELEMENT METHOD
Research in structural and solid mechanics, 1982
[NASA-CP-2245] N82-33739
Application of a boundary element method to the study of dynamical torsion of beams N82-33747
A novel boundary element method program for heat transfer analysis of composite materials N82-33748
Dynamic response of lined tunnels by boundary elements N82-33755
BOUNDARY LAYER SEPARATION
Separated diffuser flow analysis, volume 1
[AD-A117668] N82-33669
BOUNDARY LAYERS
Guidelines for siting WECS relative to small-scale terrain features
[DE82-009124] N82-33847
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
Marine atmospheric boundary layer and inversion forecast model
[AD-A115769] N82-33949
BOUNDARY VALUE PROBLEMS
Numerical stability analysis of a compressor model
[AD-A116878] N82-33396
Existence of a global weak solution to the nonlinear waterhammer program
[DE82-010717] N82-33678
Operator split methods in the numerical solution of the finite deformation elastoplastic dynamic problem N82-33742
Asymptotic and numerical methods for vector systems of singularly-perturbed boundary value problems
[AD-A117111] N82-34141
Finite difference approximations and stability of distributed parameter systems
[PB82-177635] N82-34158
BRADYCARDIA
Influence of the diving response and submersion on the breath-holding time in man N82-33998
BRAZIL
The use of LANDSAT data to monitor the urban growth of Sao Paulo Metropolitan area
[E82-10294] N82-33793
BREAKWATERS
Coastal construction practices
[PB82-201062] N82-33591
BREATHING
Influence of the diving response and submersion on the breath-holding time in man N82-33998
BREATHING APPARATUS
Low temperature tests of rescue breathing apparatus
[PB82-172727] N82-34086
BRIDGES (STRUCTURES)
Polymer concrete and its application to bridge deck maintenance
[PB82-177940] N82-33579
An experimental study of bolted shear connections
[PB82-201518] N82-33788
BRIGHTNESS
The white light solar corona: An atlas of K-coronameter synoptic charts, August 1980 - September 1981
[PB82-179706] N82-34334
BRINES
Flow characteristics in geopressured zones and salt water aquifers
[PB82-181280] N82-33807
BROADBAND
HF wideband modem
[AD-A116859] N82-33603
BROADCASTING
Satellite communications/direct broadcast satellites
[GPO-90-289] N82-33412
International shortwave broadcasting and direct broadcast satellites: Voice of America, Radio Free Europe/Radio Liberty, Radio Marti
[H-REPT-97-398] N82-33595
BUCKLING
Vibrations of axially loaded stiffened cylindrical panels with elastic restraints
[TAE-439] N82-33730
Further initial imperfection measurements of integrally Stringer stiffened cylindrical shell, series 2
[TAE-404] N82-33731
Advances and trends in plate buckling research N82-33760
BUFFETING
Results of buffet tests in a cryogenic wind tunnel
[NASA-TM-84520] N82-33342
BUILDINGS
Susceptibility of symmetric structures to nonlinear torsional coupling N82-33759
BUMPY TORUSES
Research support for plasma diagnostics on Elmo Bumpy diamagnetic measurements for the electron rings and development of a ferromagnetic resonance magnetometer
[DE82-007245] N82-34259
Calibration of a diamagnetic diagnostic for stored energy of high-temperature electron annuli in Elmo Bumpy Torus (EBT)
[DE82-015235] N82-34271
BUOYS
Five OTEC biofouling and corrosion experiments at Keahole Point, 1976 to 1980
[DE82-008086] N82-33987
BUTADIENE
Development of tough, moisture resistant laminating resins
[NASA-CR-3615] N82-33432

C

CADMIUM SULFIDES
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-009398] N82-33842
CADMIUM TELLURIDES
Growth of HgCdTe by modified molecular beam epitaxy
[AD-A117752] N82-34199
Large plate CdTe synthesis by sealed vessels transport
[AD-A117524] N82-34286
CALCITE
The interaction of manganese(II) with the surface of calcite in dilute solutions and seawater
[DE82-011104] N82-33475
CALCIUM COMPOUNDS
Calcium inorganic electrolyte battery development
[AD-A115956] N82-33831
CALCULUS
Newton's method
[DE82-013692] N82-34134
CALCULUS OF VARIATIONS
Variational analysis and approximate solutions for transport phenomena
[AD-A117110] N82-34147
CALDERAS
Calderas and mineralization: Volcanic geology and mineralization in the Chianti caldera complex, Trans-Pecos Texas
[DE82-013263] N82-33941
CALIBRATING
Method and apparatus for self-calibration and phasing of array antenna
[NASA-CASE-NPO-15920-1] N82-33593
CALORIMETERS
Calorimetric measurements of emittance of pipe surfaces: Influence of enclosure diameter, test pipe length and an argon atmosphere
[DE82-009404] N82-33675
Design and operation of an apparatus for calorimetric emittance measurements of pipe surfaces
[DE82-008713] N82-33676
CAMERAS
Feasibility evaluation and study of adapting the attitude reference system to the Orbiter camera payload system's large format camera
[NASA-CR-167629] N82-33420
CANCER
Hyperthermia heating apparatus --- cancer therapy
[NASA-CASE-NPO-14549-2] N82-33996
CANOPIES (VEGETATION)
Active microwave remote sensing research program plan. Recommendations of the Earth Resources Synthetic Aperture Radar Task Force --- application areas: vegetation canopies, surface water, surface morphology, rocks and soils, and man-made structures
[NASA-CR-167726] N82-33596
CAPACITANCE
Nickel-cadmium cell performance recovery and reconditioning
[SD-TR-82-63] N82-33823
CAPACITY
Intermediate photovoltaic system application experiment operational performance. Volume 8: Newman Power Station, El Paso, Texas
[DE82-014247] N82-33858
CARBOHYDRATE METABOLISM
Insulin resistance for glucose metabolism in disused soleus muscle of mice
[NASA-CR-169353] N82-33979
CARBON
The effect of carbon and boron on the friction behavior of Ti-implanted 52100 bearing steel at low sliding speeds
[AD-A117742] N82-33500
Development of a direct-absorption high-temperature gas receiver
[DE82-010168] N82-33838
CARBON CYCLE
Prospective significance of temperate-zone carbon pool transients, 1980 - 2010
[DE82-011866] N82-33896
CARBON DIOXIDE
Dissociative adsorption of CO2 on oxidized and reduced Pt/TiO2
[AD-A117890] N82-33473
Significant parameters in the catalyzed CO2 gasification of coal chars
[DE82-008508] N82-33480
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893
Prospective significance of temperate-zone carbon pool transients, 1980 - 2010
[DE82-011866] N82-33896
CARBON DIOXIDE LASERS
Continuously-tunable high-repetition rate RF-excited CO2 waveguide laser
[NDRC/PUBL-82/1002] N82-33695
CO2 laser waveguiding in GaAs MBE layers
[AD-A117394] N82-33708
CARBON FIBER REINFORCED PLASTICS
Hygrothermal effects on the micromechanisms of crack extension in glass fibre and carbon fibre composites
[PB82-176728] N82-33447
CARBON FIBERS
Investigations into a more general solution to the problem of matrix interferences in combined atomizer atomic absorption spectrometry N82-33454
Advanced carbon fabric/phenolics for thermal protection applications
[AD-A116829] N82-33534
CARBON MONOXIDE
Exhaust emissions reduction for intermittent combustion aircraft engines
[NASA-CR-167914] N82-33392
The adsorption and oxidation of carbon monoxide in strong acid solutions N82-33449
Thermal desorption of H2 and CO on Pt/TiO2
[AD-A117888] N82-33466
Determination of carbon monoxide in air by triple quadrupole mass spectrometry
[AD-A117443] N82-33470
Dissociative adsorption of CO2 on oxidized and reduced Pt/TiO2
[AD-A117890] N82-33473
Studies of metal: Semiconductor interfaces in catalysis and energy conversion
[DE82-011863] N82-33509
CARBONATES
Evaluation of natural gas molten carbonate fuel cell power plants
[PB82-181272] N82-33881
The comparative sedimentology of the Bahama type shelf carbonates of the middle Ordovician St. Paul group of the central Appalachians N82-33915
CARBONYL COMPOUNDS
Measurement of tropospheric carbonyl sulfide by microwave spectrometry
[NASA-CR-169417] N82-33920
CAROTID SINUS BODY
Respiratory adaptation to acute metabolic acidosis in goats with ablated carotid bodies
[AD-A116657] N82-33984
CARTILAGE
Stimulation of body weight increase and epiphyseal cartilage growth by insulin like growth factor
[NASA-TM-84285] N82-33983
CASCADE FLOW
Supersonic cascade flows with subsonic axial Mach number
[CUED/A-TURBO/TR-110] N82-33343
CATALYSTS
Significant parameters in the catalyzed CO2 gasification of coal chars
[DE82-008508] N82-33480

Reference book for the nitrogen industry worker in two volumes, volume 1
[AD-A115651] N82-33569
Development of a long-life high-temperature catalyst for the SO2/SO3 energy-storage system
[DE82-009723] N82-33840

CATALYTIC ACTIVITY
Moessbauer spectroscopic and related characterization of Fischer-Tropsch catalysts
[DE82-009280] N82-33476
Hydroprocessing of solvent-refined coal: Catalyst-screening results
[DE82-008568] N82-33479
Metal alkoxides: Models for metal oxides
[AD-A117947] N82-33503

CATIONS
Development of host crystals for Ce(+3) blue and blue-green solid-state lasers
[AD-A117899] N82-33710

CAVES
Geotechnical issues and guidelines for storage of compressed air in excavated hard rock caverns
[DE82-015027] N82-33872
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary
[DE82-008345] N82-33877

CAVITIES
High performance channel injection sealant invention abstract
[NASA-CASE-ARC-14408-1] N82-33523

CAVITY RESONATORS
Finite-amplitude standing waves in a cavity with boundary perturbations
[AD-A115719] N82-34192

CELLS (BIOLOGY)
Bioelectric fields: Their sources, nature and purpose N82-33991
Air pollutant production by algal cell cultures
[NASA-CR-166384] N82-34076

CENSORED DATA (MATHEMATICS)
Ranking and subset selection procedures for exponential populations with Type-1 and Type-2 censored data
[AD-A115821] N82-34161

CERAMICS
Ceramic gas turbine engine demonstration program
[AD-A117088] N82-33395
Advanced ceramic coating development for industrial/utility gas turbines
[NASA-CR-169852] N82-33494
Advanced joining technology
[AD-A117503] N82-33715
Diffraction and microscopy studies of the structure of grain boundaries in Fe, Fe-base alloys, and ceramic materials
[DE82-009553] N82-34287

CERIUM
Development of host crystals for Ce(+3) blue and blue-green solid-state lasers
[AD-A117899] N82-33710

CERTIFICATION
Resolution of contamination problems affecting laser surface certification inspection
[DE82-008775] N82-33711

CH-47 HELICOPTER
Non-complex item development specification for a feasibility model of an electronic master monitor and advisory display system (EMMADS)
[AD-A117919] N82-33386

CHAMBERS
Large plate CdTe synthesis by sealed vessels transport
[AD-A117524] N82-34286

CHANNEL FLOW
Interaction of oscillations of channel flow and flow separation at duct discontinuities
[AD-A116801] N82-33666

CHANNELS (DATA TRANSMISSION)
A comparison of control modes for time-delayed remote manipulation N82-34072

CHARACTERIZATION
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N82-33526
Characterization of coal-derived liquids and other fossil-fuel-related materials employing mass spectrometry
[DE82-015005] N82-33558

CHARGED PARTICLES
Inelastic interactions of 4.5 GeV/c protons with emulsion nuclei not accompanied by relativistic charged particles
[DE82-701020] N82-34207
Importance of elastic scattering to particle direction determination in Monte Carlo calculations of DT reactions in flight
[DE82-015080] N82-34210
Utilization of quantum distribution functions for ultra submicron device transport
[AD-A117433] N82-34280

CHARRING
Significant parameters in the catalyzed CO2 gasification of coal chars
[DE82-008508] N82-33480

CHECKOUT
Fault diagnosis of nonlinear analog circuits. Volume 1. DC diagnosis of hard failures
[AD-A117567] N82-33645

CHEMICAL ANALYSIS
Hydrocarbon fuel chemistry: Sediment water interaction
[AD-A117928] N82-33552
Characterization of coal-derived liquids and other fossil-fuel-related materials employing mass spectrometry
[DE82-015005] N82-33558

CHEMICAL BONDS
Microwave spectroscopy of weakly bound molecular complexes N82-33451

CHEMICAL COMPOSITION
Raman spectroscopy for in-situ monitoring of electrode processes
[DE82-014909] N82-33486

CHEMICAL COMPOUNDS
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813

CHEMICAL EFFECTS
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813

CHEMICAL ENGINEERING
The 26th AFOSR chemical and atmospheric sciences program review FY81
[AD-A117325] N82-33930

CHEMICAL EQUILIBRIUM
Solvent extraction of nickel and copper from laterite-ammoniacal leach liquors
[PB82-176587] N82-33518

CHEMICAL LASERS
Study of molecular collision dynamics for chemical laser systems
[AD-A117938] N82-33709

CHEMICAL PROPERTIES
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542
Reference book for the nitrogen industry worker in two volumes, volume 1
[AD-A115651] N82-33569
New data on metabolism and action mechanism of mycotoxins N82-33989

CHEMICAL REACTIONS
Studies on the syntheses of boron hydride systems
[AD-A115817] N82-33467
The interaction of manganese(II) with the surface of calcite in dilute solutions and seawater
[DE82-011104] N82-33475
Nitrogen oxide transformations in power-plant plumes
[DE82-901847] N82-33897

CHEMICAL REACTORS
Progress in the entrained-flow, fast-ablative pyrolysis of biomass
[DE82-009911] N82-33478
Solvent Refined Coal (SRC) Process. Effect of mixing energy on hydrogen reaction rates in SRC-11 reactors
[DE82-008447] N82-33481
Coal gasification reactions with on-line in-situ FTIR analysis
[DE82-005658] N82-33485
Development of a long-life high-temperature catalyst for the SO2/SO3 energy-storage system
[DE82-009723] N82-33840

CHEMICAL WARFARE
Microclimate cooling for combat vehicle crewmen
[AD-A117156] N82-34083

CHEMICALS
TMA chemical release payloads for stratospheric wind measurements auroral E program and related programs
[AD-A115832] N82-33921

CHEMISORPTION
Studies of metal: Semiconductor interfaces in catalysis and energy conversion
[DE82-011863] N82-33509

CHINESE SPACE PROGRAMS
Aeronautical knowledge (selected articles)
[AD-A115649] N82-33335

CHIPS (MEMORY DEVICES)
Advanced on-board signal processor gallium arsenide memory
[AD-A117151] N82-34091

CHLORINE
High energy surfuryl chloride batteries
[AD-A117106] N82-33833

CHLOROCARBONS
Application of In Situ Fiberization for fabrication of improved strain isolation pads and graphite epoxy composites
[NASA-CR-3616] N82-33431

CHROMIUM COMPOUNDS
Chemical and electrochemical behavior of the Cr(3)/Cr(2) half cell in the NASA Redox Energy Storage System
[NASA-TM-82913] N82-33463

CHROMOSPHERE
Evidence for extended chromospheres surrounding red giant stars
[NASA-CR-169349] N82-34316

CIRCUIT BOARDS
A system for computer-aided design of printed circuit boards
[AD-A117696] N82-33653

CIRCUIT BREAKERS
The 1200-kV system study
[DE82-014512] N82-33659

CIRCUITS
Servo systems of combined control
[AD-A115994] N82-33639
The CRITTER system: Analyzing digital circuits by propagating behavior and specifications
[AD-A117887] N82-33650
Framework for power-network analysis
[DE82-012724] N82-33658

CIRCULAR CYLINDERS
Vortex shedding from cylinders and the resulting unsteady forces and flow phenomenon, part 1 N82-34338

CIRCULATORS (PHASE SHIFT CIRCUITS)
Waveguide Y-circulator
[AD-A112086] N82-33637

CITIES
The use of LANDSAT data to monitor the urban growth of Sao Paulo Metropolitan area
[E82-10294] N82-33793

CIVIL AVIATION
Effectiveness of the Civil Aviation Security program
[AD-A117671] N82-33362
Preliminary analysis of the benefits and costs to implement the National Airspace System Plan
[AD-A117664] N82-33369
An Operational evaluation of head up displays for civil transport operations. NASA/FAA phase 3 report
[NASA-TP-1815] N82-33381
Automated Low-cost Weather Observation System (ALWOS)
[AD-A117447] N82-33954

CLASSIFICATIONS
Evaluation of spatial filtering on the accuracy of wheat area estimate
[E82-10292] N82-33792
An analysis of the max-min texture measure
[AD-A116768] N82-33799

CLEANING
Resolution of contamination problems affecting laser surface certification inspection
[DE82-008775] N82-33711
Wall conditioning of the JIPP T-II Torus by ac discharge cleaning
[IPPJ-595] N82-34246

CLEARANCES
Rotor tip clearance effects on overall and blade-element performance of axial-flow transonic fan stage
[NASA-TP-2049] N82-33389

CLIMATE
The geologic record of climatic change
[NASA-TM-83956] N82-33946
Atlantic coast water-level climate
[AD-A117147] N82-33951
A general climatological guide to daily freezing conditions: Frost days, ice days and freeze-thaw days
[AD-A116771] N82-33952

CLIMATOLOGY
Overview of the aerothermal environment of air-launched missiles
[AD-A116799] N82-33924

CLINICAL MEDICINE
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) laboratory test results
[AD-A114073] N82-34012

CLOCKS
James Clerk Maxwell's Cambridge manuscripts: Extracts relating to control and stability, part 1
[PB82-180571] N82-34160

CLOSED ECOLOGICAL SYSTEMS
Application of control theory to dynamic systems simulation
[NASA-CR-166383] N82-34077
CLOSURE LAW
Training aircraft design considerations based on the successive organization of perception in manual control N82-34043
CLOUD PHYSICS
The 26th AFOSR chemical and atmospheric sciences program review FY81
[AD-A117325] N82-33930
Ice forming experiment
[NASA-CR-170623] N82-33948
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 4: FACE-2 microphysical data for analyses of seeded and unseeded cumulus towers
[PB82-172149] N82-33964
Cloud physics studies in SCPP(Sierra Cooperative Pilot Project) during 1980-1981
[PB82-174210] N82-33967
CLOUD SEEDING
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 2: The FACE-2 confirmatory radar rainfall and covariate data sets
[PB82-172131] N82-33963
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 4: FACE-2 microphysical data for analyses of seeded and unseeded cumulus towers
[PB82-172149] N82-33964
CLOUDS
A dynamical model for prediction of formation, growth and dissipation of a cloud
[AD-A117452] N82-33955
Cloud and precipitation particle size spectra
[AD-A117457] N82-33956
Light scattering calculations for the nephelometer experiment on the 1981/1982 Jupiter Orbiter-Probe mission
[NASA-CR-169418] N82-34323
COAL
Atomization characteristics of coal-water mixtures
[DE82-009093] N82-33477
Assessment of underground coal gasification in bituminous coals. Volume 1: Executive summary
[DE82-014584] N82-33557
Applicability of factor analysis to the determination of mineral matter in coal N82-33790
Field survey of float dust in coal mining operations
[PB82-172719] N82-33812
Potential health and environmental effects of the fluidized-bed combustion of coal
[DE82-014389] N82-33900
Coal mining and ground-water resources in the United States
[PB82-182056] N82-33903
COAL DERIVED GASES
Moessbauer spectroscopic and related characterization of Fischer-Tropsch catalysts
[DE82-009280] N82-33476
Development of a solid absorption process for removal of sulfur from fuel gas
[DE82-012996] N82-33484
COAL DERIVED LIQUIDS
The H-coal and SRC-2 processes
[PB82-173998] N82-33491
Characterization of coal-derived liquids and other fossil-fuel-related materials employing mass spectrometry
[DE82-015005] N82-33558
Feasibility study for a coal-sourced methanol project
[DE82-008137] N82-33559
COAL GASIFICATION
Significant parameters in the catalyzed CO2 gasification of coal chars
[DE82-008508] N82-33480
Status report for the Solvent-Refined-Coal (SRC-2) demonstration project
[DE82-009653] N82-33483
Coal gasification reactions with on-line in-situ FTIR analysis
[DE82-005658] N82-33485
Effect of simulated medium-Btu coal-gasifier atmospheres on the biaxial stress-rupture behavior of four candidate coal-gasifier alloys
[DE82-010614] N82-33507
Assessment of underground coal gasification in bituminous coals. Volume 1: Executive summary
[DE82-014584] N82-33557
Feasibility study for a coal-sourced methanol project
[DE82-008137] N82-33559
Assessment of a coal-gasification fuel-cell system for utility application
[DE82-903867] N82-33870
COAL LIQUEFACTION
Hydroprocessing of solvent-refined coal: Catalyst-screening results
[DE82-008568] N82-33479
Solvent Refined Coal (SRC) Process. Effect of mixing energy on hydrogen reaction rates in SRC-11 reactors
[DE82-008447] N82-33481
Status report for the Solvent-Refined-Coal (SRC-2) demonstration project
[DE82-009653] N82-33483
Exxon donor solvent coal liquefaction process
[PB82-177460] N82-33490
Apparatus development for measuring heat flux in a direct coal-liquefaction preheater
[DE82-012013] N82-33692
COAL UTILIZATION
The H-coal and SRC-2 processes
[PB82-173998] N82-33491
Influence of sulfation-enhanced salt additives on the corrosion behavior of materials in atmospheric fluidized-bed combustors
[DE82-010204] N82-33670
Preliminary economic analysis of NO sub x flue-gas treatment processes using TVA and EPRI economic premises
[DE82-902223] N82-33895
Symposium on Environmental Technology and Management
[PB82-185273] N82-33902
COASTAL CURRENTS
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973
COASTAL WATER
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973
COASTS
Coastal construction practices
[PB82-201062] N82-33591
Atlantic coast water-level climate
[AD-A117147] N82-33951
Objective specification of Atlantic Ocean wind fields from historical data
[AD-A117683] N82-33958
COAXIAL CABLES
Semirigid coaxial RF cable bending techniques
[DE82-016029] N82-33785
COBALT ALLOYS
Overlay metallic-cermet alloy coating systems --- for gas turbine engines
[NASA-CASE-LEW-13639-1] N82-33522
COBALT COMPOUNDS
Ultimate intrinsic coercivity samarian-cobalt magnet. An Earth based feasibility study for Space Shuttle missions
[NASA-CR-170627] N82-33495
COBOL
United Computing Systems, Inc. CYBER 730, CDC COBOL 5.3 Level 528
[PB82-169509] N82-34100
Experimental investigation of programming complexity in COBOL
[AD-A116811] N82-34108
International Business Machines Corporation, IBM Series/1 COBOL 5719-CB7 version 2 Level 0 (COBOL technical report)
[PB82-155342] N82-34120
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEP, PRPQ P82648 Version 2 Level 0 (validation summary report)
[PB82-155359] N82-34121
International Business Machines Corporation, IBM Series/1 COBOL 5719-CB7 version 2 level 0 (validation summary report)
[PB82-155367] N82-34122
International Business Machines Corporation, IBM Series/1 COBOL (EDX)5719-CB5 version 2 level 0 (validation summary report)
[PB82-155375] N82-34123
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEL, PRPQ P82647 version 2 level 0 (COBOL technical report)
[PB82-155383] N82-34124
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEL, PRPQ P82647 version 2 level 0 (validation summary report)
[PB82-155391] N82-34125
COCKPIT SIMULATORS
Combined discrete network. Continuous control modelling of operator behavior N82-34064
COCKPITS
Speech Command Auditory Display System (SCADS)
[AD-A117486] N82-33387
A systems approach for crew station design and evaluation
[AD-A115663] N82-34080
COERCIVITY
Ultimate intrinsic coercivity samarian-cobalt magnet. An Earth based feasibility study for Space Shuttle missions
[NASA-CR-170627] N82-33495
COGENERATION
The potential for industrial cogeneration development by 1990
[RA-81-1455] N82-33822
COGNITION
A theory of diagnostic interference. 1: Imagination and the psychophysics of evidence
[AD-A115940] N82-34026
Combined discrete network. Continuous control modelling of operator behavior N82-34064
COHERENT LIGHT
Micom program in light control by light
[AD-A117159] N82-33706
COHERENT RADAR
Tracking closely spaced multiple sources via spectral-estimation techniques
[AD-A116967] N82-33607
COLD WATER
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973
COLD WEATHER
Cold weather goggles. Part 3: Resistance to fogging
[AD-A115898] N82-34078
COLLAPSE
Extensional collapse modes of structural members N82-33765
COLLISION AVOIDANCE
Separation monitoring with four types of predictors on a cockpit display of traffic information N82-34063
COLLISIONLESS PLASMAS
An analysis of current drive by travelling wave based on theory of intrinsic stochasticity
[IPPJ-575] N82-34235
COLLOIDS
Compressibility of colloids. 1: Compressibility studies of aqueous solutions of amphibilic polymers and their adsorbed state on Polystyrne latex dispersions by ultrasonic velocity measurements
[AD-A117416] N82-33538
COLONIES
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994
COLUMNS (PROCESS ENGINEERING)
Loading and unloading resin from MPPF rapid ion exchange columns
[DP-1609] N82-33458
COMBAT
Survey and update of F-14A mission profiles for TF30 engine usage
[AD-A116831] N82-33337
COMBINED CYCLE POWER GENERATION
Technical evaluation: Pressurized fluidized-bed combustion technology
[DE82-014903] N82-33487
System study of an MHD/gas turbine combined-cycle baseload power plant
[DE82-015215] N82-33869
COMBUSTION CHAMBERS
Technical evaluation: Pressurized fluidized-bed combustion technology
[DE82-014903] N82-33487
Long-term materials test program: Materials exposure test plan
[DE82-013322] N82-33516
Influence of sulfation-enhanced salt additives on the corrosion behavior of materials in atmospheric fluidized-bed combustors
[DE82-010204] N82-33670
Nonlinear constitutive theory for turbine engine structural analysis N82-33744
Low NOx heavy fuel combustor concept program
[NASA-CR-165481] N82-33827
COMBUSTION PHYSICS
Progress in the entrained-flow, fast-ablative pyrolysis of biomass
[DE82-009911] N82-33478
COMBUSTION PRODUCTS
A laboratory model for the evaluation of the toxic natures of combustion products
[RAE-TRANS-2083] N82-33464
Particulate-analysis instrumentation for systems
[DE82-012464] N82-33693
COMBUSTION STABILITY
Augmentor stability management program
[AD-A117926] N82-33426
COMMAND AND CONTROL
Communications processor for C3 analysis and wargaming
[AD-A115751] N82-33597

COMMERCIAL AIRCRAFT
Effectiveness of the Civil Aviation Security program [AD-A117671] N82-33362
An Operational evaluation of head up displays for civil transport operations. NASA/FAA phase 3 report [NASA-TP-1815] N82-33381
A model-based technique for predicting pilot opinion ratings for large commercial transports N82-34050

COMMUNICATION
A two-component rain model for the prediction of attenuation and diversity improvement [NASA-CR-169198] N82-33592

COMMUNICATION EQUIPMENT
An approach to describing the functional requirements of an embedded communication system [AD-A115738] N82-33598
Measured performance of a delay lock tracking loop when noise power exceeds signal power [AD-A116797] N82-33606
Digital communications techniques and equipment for law enforcement use [PB82-195496] N82-33632

COMMUNICATION NETWORKS
Communications processor for C3 analysis and wargaming [AD-A115751] N82-33597
Decision-Feedback Equalizer Simulation (DFES): Description of variables [AD-A117898] N82-33626
Timing subsystem development [AD-A117609] N82-33647
Improved microprocessor design [AD-A110858] N82-34088
Distributed minimum hop algorithms [AD-A117808] N82-34151

COMMUNICATION SATELLITES
Satellite communications/direct broadcast satellites [GPO-90-289] N82-33412

COMPACTING
Explosive-powder compaction system [DE82-003134] N82-33556

COMPARISON
Characterization and evaluation of re-refined engine lubricating oil [AD-A118573] N82-33526
Computer-aided manufacturing: An international comparison [PB82-172321] N82-33573
Prolonged self-paced hard physical exercise comparing trained and untrained men [AD-A116608] N82-34006
Comparison of rhesus and human spectral dynamic visual acuity [AD-A115258] N82-34018
A Toeplitz Gram-Schmidt algorithm for autoregressive modeling [AD-A117071] N82-34145
An evaluation of the relative performance of three infrared imagers through fog [AD-A116893] N82-34222

COMPATIBILITY
Compatibility of polyacetylene with lithium battery materials [AD-A117684] N82-33837

COMPENSATORS
Practical methods for the compensation and control of multivariable systems [AD-A117728] N82-34133

COMPENSATORY TRACKING
Modeling of human operator dynamics in simple manual control utilizing time series analysis --- tracking (position) N82-34038

COMPETITION
Competition in the photovoltaics industry: A question of balance [PB82-171570] N82-33886

COMPILERS
United Computing Systems, Inc. CYBER 730, CDC COBOL 5.3 Level 528 [PB82-169509] N82-34100
Experimental investigation of programming complexity in COBOL [AD-A116811] N82-34108
International Business Machines Corporation, IBM Series/1 COBOL 5719-CB7 version 2 Level 0 (COBOL technical report) [PB82-155342] N82-34120
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEP, PRPQ P82648 Version 2 Level 0 (validation summary report) [PB82-155359] N82-34121
International Business Machines Corporation, IBM Series/1 COBOL 5719-CB7 version 2 level 0 (validation summary report) [PB82-155367] N82-34122
International Business Machines Corporation, IBM Series/1 COBOL (EDX)5719-CB5 version 2 level 0 (validation summary report) [PB82-155375] N82-34123
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEL, PRPQ P82647 version 2 level 0 (COBOL technical report) [PB82-155383] N82-34124
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEL, PRPQ P82647 version 2 level 0 (validation summary report) [PB82-155391] N82-34125

COMPLEX COMPOUNDS
Microwave spectroscopy of weakly bound molecular complexes N82-33451
Metal alkoxides: Models for metal oxides [AD-A117947] N82-33503

COMPOSITE MATERIALS
Structural tailoring of engine blades (STAEBL) [NASA-CR-167949] N82-33391
Strength diagrams of fibrous composites with unidirectional structure [NASA-TM-76975] N82-33433
Positron annihilation spectroscopy with magnetically analyzed beams [NASA-TM-84535] N82-33435
Research on dynamics of composite and sandwich plates, 1979 - 1981 [AD-A117946] N82-33441
Nondestructive inspection and evaluation of composite-material flywheels [DE82-014875] N82-33444
Damage accumulation during fatigue of composites [PB82-182312] N82-33445
Development of a high conductivity intercalated graphite composite wire [DE82-008973] N82-33655

COMPOSITE STRUCTURES
Mechanics of bimodular composite structures [AD-A117942] N82-33776
Three-dimensional finite-element analysis of layered composite structures [AD-A117492] N82-33780

COMPRESSED AIR
Geotechnical issues and guidelines for storage of compressed air in excavated hard rock caverns [DE82-015027] N82-33872
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary [DE82-008345] N82-33877

COMPRESSIBILITY
Finite difference modeling of rotor flows including wake effects [NASA-TM-84280] N82-33345
Compressibility of colloids. 1: Compressibility studies of aqueous solutions of amphibilic polymers and their adsorbed state on Polystyrne latex dispersions by ultrasonic velocity measurements [AD-A117416] N82-33538
Feasibility study: Hollow plastic spheres to increase hydraulic fluid compressibility [NASA-CR-169374] N82-33539

COMPRESSIBLE FLOW
Computation of two-dimensional time-dependent natural convection of compressible fluid in a rectangular enclosure [PB82-198797] N82-33679
Density measurement in air with saturable absorbing seed gas [NASA-CR-169420] N82-33919

COMPRESSIBLE FLUIDS
Two dimensional viscous flow of a compressible fluid [AD-A116913] N82-33667

COMPRESSORS
Numerical stability analysis of a compressor model [AD-A116878] N82-33396

COMPUTATION
Computational aerodynamics and design [NASA-TM-84257] N82-33348
The fluid mechanics of non-nucleating wet steam flows [CUED/A-TURBO/TR-111] N82-33662
Vectorized sparse elimination [AD-A117112] N82-34094
Optical computations for image bandwidth compression [AD-A117722] N82-34233

COMPUTATIONAL FLUID DYNAMICS
Euler solutions of supersonic wing-body interference at high incidence including vortex effects [NEAR-TR-263] N82-33341
Computation of two-dimensional turbulent flow at subsonic Mach numbers over thick trailing edges [NASA-TM-84278] N82-33663
Separated diffuser flow analysis, volume 1 [AD-A117668] N82-33669
James Clerk Maxwell's Cambridge manuscripts: Extracts relating to control and stability, part 1 [PB82-180571] N82-34160
Three-dimensional numerical studies of the physics of semiconductor crystal growth [AD-A116861] N82-34277

COMPUTER AIDED DESIGN
Computational aerodynamics and design [NASA-TM-84257] N82-33348
Computations of projectile Magnus effect at transonic velocities [AD-A117313] N82-33353
Structural tailoring of engine blades (STAEBL) [NASA-CR-167949] N82-33391
Design of microstrip linear array antennas by computer [AD-A117399] N82-33620
A system for computer-aided design of printed circuit boards [AD-A117696] N82-33653
A three-dimensional stability analysis/design program (3DSAD). Report 3. General Analysis Module (CGAM) [AD-A117387] N82-33772
A computer aided workstation assesor for crew operations - WOSTAS [AD-A116045] N82-34079
Computer-aided design, drawing and manufacturing system for dies and molds [NRC/CNR-TT-2030] N82-34101

COMPUTER AIDED MANUFACTURING
Computer-aided manufacturing: An international comparison [PB82-172321] N82-33573
GMA welding experiments using real-time control [PB82-204652] N82-33722
Computer-aided design, drawing and manufacturing system for dies and molds [NRC/CNR-TT-2030] N82-34101

COMPUTER COMPATIBLE TAPES
Description of a magnetic tape containing the principal facts of approximately 64000 gravity stations in the State of California [PB82-168279] N82-33943

COMPUTER GRAPHICS
A system for computer-aided design of printed circuit boards [AD-A117696] N82-33653
A version of the graphics-oriented interactive finite element time-sharing system (GIFTS) for an IBM with CP/CMS [AD-A116798] N82-34092
Computer graphic representation of remote environment using position tactile sensors [AD-A116912] N82-34111
Octree generation, analysis and manipulation [AD-A117450] N82-34112
Analysis of interactive graphics display equipment for an automated photo interpretation system [AD-A117647] N82-34115
Information display systems. Summary of project status [DE82-009971] N82-34304

COMPUTER NETWORKS
Earth station interface for demand assignment applications [AD-A117721] N82-33627
Distributed versus centralized database systems: Transaction execution cost and performance analysis [AD-A117915] N82-34097
A note on COPE: A software tool for modeling and evaluating the performance of computing systems [FUB-7-1982] N82-34119
Systems performance measurement and analysis [DE82-009067] N82-34126

COMPUTER PROGRAM INTEGRITY
Improving software quality assurance methods [AD-A116980] N82-34109

COMPUTER PROGRAMMING
An emulator for minimizing finite element analysis implementation resources N82-33751
Experimental investigation of programming complexity in COBOL [AD-A116811] N82-34108

COMPUTER PROGRAMS
Recent applications of the transonic wing analysis computer code, TWING [NASA-TM-84283] N82-33346
Enhancements and algorithms for avionic information processing system design methodology [AD-A117948] N82-33385
Predictive model for jet engine test cell opacity [AD-A117585] N82-33397
Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system [AD-A117141] N82-33407

Numerical solution of an ill-posed problem arising in wind tunnel heat transfer data reduction
[AD-A117572] N82-33409
Communications processor for C3 analysis and wargaming
[AD-A115751] N82-33597
A FORTRAN program for rectangular microstrip antennas
[AD-A116952] N82-33612
Timing subsystem development
[AD-A117609] N82-33647
A system for computer-aided design of printed circuit boards
[AD-A117696] N82-33653
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium
[DE82-009289] N82-33673
A novel boundary element method program for heat transfer analysis of composite materials N82-33748
NASTRAN and FEARS analysis of two problems of plane elasticity
[AD-A117713] N82-33782
Development of a minicomputer atmospheric noise model
[AD-A117851] N82-33936
Marine atmospheric boundary layer and inversion forecast model
[AD-A115769] N82-33949
Description/demonstration of BIODYN-80. A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limbs, head and eyes N82-34057
Application of a pilot control strategy identification technique to a joint FAA/NASA ground-based simulation of head-up displays for CTOL aircraft N82-34061
Experimental evaluation of the concept of supervisory manipulation N82-34073
A version of the graphics-oriented interactive finite element time-sharing system (GIFTS) for an IBM with CP/CMS
[AD-A116798] N82-34092
Ensemble averaging of acoustic data N82-34102
Weapon system software acquisition and support: A theory of system structure and behavior
[AD-A115555] N82-34103
Virtual information facility of the INFOPLEX software test vehicle, part 1
[AD-A116502] N82-34104
Virtual information facility of the INFOPLEX software test vehicle, part 2
[AD-A116503] N82-34105
Experimental investigation of programming complexity in COBOL
[AD-A116811] N82-34108
XERROR: The SLATEC error-handling package
[DE82-015494] N82-34116
Nonalgebraic symbol manipulators for use in scientific and engineering modeling: Introducing the FORSE (FORTRAN Symbol Expander)
[DE82-009818] N82-34118
A note on COPE: A software tool for modeling and evaluating the performance of computing systems
[FUB-7-1982] N82-34119
Environmental assessment model for shallow land disposal of low-level radioactive wastes
[DE82-001830] N82-34214
Three-dimensional thermal analysis for a conceptual high-level waste repository in welded tuff
[DE82-015503] N82-34217

COMPUTER STORAGE DEVICES
Memory and computational requirements for tracking in the advanced computer system
[AD-A117666] N82-33619
A program of research on microfabrication techniques for VLSI magnetic devices
[AD-A117922] N82-34281

COMPUTER SYSTEMS DESIGN
Examination of the Federal Aviation Administration's plan for the National Airspace System
[AFMD-82-66] N82-33403
System identification: A question of uniqueness, revisited N82-33763
Improved microprocessor design
[AD-A110858] N82-34088

COMPUTER SYSTEMS PERFORMANCE
Distributed versus centralized database systems: Transaction execution cost and performance analysis
[AD-A117915] N82-34097
A note on COPE: A software tool for modeling and evaluating the performance of computing systems
[FUB-7-1982] N82-34119
Systems performance measurement and analysis
[DE82-009067] N82-34126

COMPUTER SYSTEMS PROGRAMS
An emulator for minimizing finite element analysis implementation resources N82-33751
United Computing Systems, Inc. CYBER 730, CDC COBOL 5.3 Level 528
[PB82-169509] N82-34100

COMPUTER TECHNIQUES
Investigation into Air Launch Cruise Missile (ALCM) flight information loading and display techniques during flex targeting procedure
[AD-A115744] N82-33376
Vectorized sparse elimination
[AD-A117112] N82-34094

COMPUTERIZED SIMULATION
Development of methods for assessment of gliding parachute applications
[AD-A117103] N82-33356
Dayton aircraft cabin fire model, version 3. Volume 1: Physical description
[AD-A117905] N82-33361
Study of an automatic trajectory following control system
[NASA-CR-169361] N82-33399
Decision-Feedback Equalizer Simulation (DFES): Description of variables
[AD-A117898] N82-33626
Evaluation of underground dc transmission systems
[DE82-012312] N82-33660
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium
[DE82-009289] N82-33673
A computer simulation approach to measurement of human control strategy N82-34046
Does man always close the loop in trying to pilot a large ship? N82-34068

COMPUTERS
The CRITTER system: Analyzing digital circuits by propagating behavior and specifications
[AD-A117887] N82-33650
Human capital adjustments to technological change in the computer industry: The case of scientists and engineers
[PB82-180969] N82-34036
United Computing Systems, Inc. CYBER 730, CDC COBOL 5.3 Level 528
[PB82-169509] N82-34100

CONCRETES
Cracking and toughness of concrete and polymer-concrete dispersed with short steel wires
[PB82-180589] N82-33578
Polymer concrete and its application to bridge deck maintenance
[PB82-177940] N82-33579
Program package for nonlinear analysis of reinforced concrete structures
[PB82-204744] N82-33585
The Catskill-Cairo experimental rigid pavement: A ten-year progress report
[PB82-201229] N82-33589
Placement of an experimental heater-scarified in-place recycled pavement
[PB82-197237] N82-33590
Durability of reinforced concrete beams exposed to marine environment
[AD-A117284] N82-33768
Durability of post-tensioned concrete beams exposed to severe natural weathering
[AD-A13130] N82-33769
Reinforced concrete modeling
[AD-A117925] N82-33775
Investigations on the improvement of corrosion resistance and strength of ribbed reinforcing steel bars in concrete, especially when subject to fatigue loading
[PB82-204330] N82-33787

CONDENSERS
Vapor condensation control of JP-4 emissions from underground storage tanks at March Air Force Base, California
[AD-A117875] N82-33554

CONDENSING
Vapor condensation control of JP-4 emissions from underground storage tanks at March Air Force Base, California
[AD-A117875] N82-33554

CONDUCTIVE HEAT TRANSFER
Finite element modeling of nonisothermal polymer flows
[NASA-CR-169355] N82-33525

CONFERENCES
Fifth International Summer Institute in Surface Science, ISISS 1981
[AD-A116933] N82-33469
Computer-aided manufacturing: An international comparison
[PB82-172321] N82-33573
Workshop on Diffuse Discharge Opening Switches
[AD-A115883] N82-33640
Symposium on Environmental Technology and Management
[PB82-185273] N82-33902
Oxygen transport to human tissues
[AD-A115904] N82-34007
Sixteenth Annual Conference on Manual Control
[NASA-TM-84273] N82-34037

CONFIDENCE LIMITS
Simultaneous confidence bands for autoregressive spectra
[AD-A117072] N82-34176

CONFINEMENT
Experimental analysis of team performance: Methodological developments and research results
[AD-A116915] N82-34034
Formation of z-discharged plasma channel in LIB-fusion device
[IPPJ-601] N82-34255

CONGRESSIONAL REPORTS
Examination of the Federal Aviation Administration's plan for the National Airspace System
[AFMD-82-66] N82-33403
Satellite communications/direct broadcast satellites
[GPO-90-289] N82-33412
The need for a fifth Space Shuttle orbiter
[GPO-96-894] N82-33418
Metric conversion in the United States N82-33568
International shortwave broadcasting and direct broadcast satellites: Voice of America, Radio Free Europe/Radio Liberty, Radio Marti
[H-REPT-97-398] N82-33595
Acid rain
[GPO-87-365] N82-33889
NASA authorization and NOAA LANDSAT authorization for 1983, volume 2
[GPO-93-418] N82-34306
Analysis of NASA's fiscal year 1983 budget request for research and development to determine the amount that supports DOD's programs
[B-207165] N82-34307
Making appropriations for the National Aeronautics and Space Administration
[H-REPT-97-897] N82-34308
Technology transfer in New Mexico
[GPO-85-343] N82-34309
Major science and technology issues
[PAD-81-35] N82-34310
The Department of Defense statement on the science and technology program by Mr. H. Mark Grove, Assistant Deputy Under Secretary of Defense for Research and Advanced Technology before the Defense Subcommittee of the Committee on Appropriations of the United States House of Representatives, 97th Congress, second session
[AD-A116788] N82-34339

CONSTITUTIVE EQUATIONS
Nonlinear constitutive theory for turbine engine structural analysis N82-33744

CONSTRAINTS
The strength of surrogate constraints for the linear zero-one integer programming problem
[AD-A115736] N82-34137

CONSTRUCTION
Coastal construction practices
[PB82-201062] N82-33591

CONSUMPTION
United Kingdom mineral statistics 1980
[PB82-172362] N82-33817

CONTACTS (GEOLOGY)
Structural geometry of the Snake River Range, Idaho and Wyoming N82-33912

CONTAINERLESS MELTS
Containerless processing technology analysis
[NASA-CR-170624] N82-33430
Ultimate intrinsic coercivity samarian-cobalt magnet. An Earth based feasibility study for Space Shuttle missions
[NASA-CR-170627] N82-33495

CONTAINERS
Three-dimensional thermal analysis for a conceptual high-level waste repository in welded tuff
[DE82-015503] N82-34217

CONTAMINANTS
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893
Air pollutant production by algal cell cultures
[NASA-CR-166384] N82-34076

CONTAMINATION
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes
[DE82-903730] N82-33898

CONTINUOUS RADIATION
Responses of FM/CW systems having filters
[AD-A117371] N82-33617
CONTRACT MANAGEMENT
An assessment of PERT as a technique for schedule planning and control
[NASA-TM-83265] N82-33981
Improving software quality assurance methods
[AD-A116980] N82-34109
CONTROL BOARDS
Development of avionics installation interface standards
[AD-A116853] N82-33384
CONTROL CONFIGURED VEHICLES
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle
N82-34062
CONTROL THEORY
System optimization by periodic control
[AD-A117815] N82-33402
Application of optimal control principles to describe the supervisory control behavior of AAA crew members
N82-34067
Levels of steering control: Reproduction of steering-wheel movements N82-34071
A comparison of control modes for time-delayed remote manipulation N82-34072
Experimental evaluation of the concept of supevisory manipulation N82-34073
Application of control theory to dynamic systems simulation
[NASA-CR-166383] N82-34077
Practical methods for the compensation and control of multivariable systems
[AD-A117726] N82-34133
Algebraic tests for functional controllability of functional differential equation systems
[AD-A117032] N82-34149
Finite difference approximations and stability of distributed parameter systems
[PB82-177635] N82-34158
James Clerk Maxwell's Cambridge manuscripts: Extracts relating to control and stability, part 1
[PB82-180571] N82-34160
CONTROL VALVES
Flight tests of a GE and DCI direct drive fly by wire flight control system
[AD-A117244] N82-33401
CONTROLLERS
Universal turret system model determination and controller performance testing
[AD-A117687] N82-33380
Summary of electric vehicle dc motor-controller tests
[NASA-TM-82863] N82-33636
Practical methods for the compensation and control of multivariable systems
[AD-A117726] N82-34133
CONVECTION
Computation of two-dimensional time-dependent natural convection of compressible fluid in a rectangular enclosure
[PB82-198797] N82-33679
CONVECTIVE FLOW
Effect of an electron beam on the current convective instability
[AD-A117908] N82-33937
CONVEXITY
Simple method of sheet plasma production for high current negative ion II (curved sheet plasma)
[IPPJ-597] N82-34240
CONVOLUTION INTEGRALS
The mean and variance of skywave radar sea-echo power spectra for discrete ionospheric multipath
[PB82-174236] N82-33631
COPOLYMERIZATION
The problem of ensuring a specified molecular weight in the process of emulsion polymerization
[NRC/CNR-TT-2026] N82-33529
COPOLYMERS
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542
Ultraviolet-radiation-curable paints
[DE82-015717] N82-33545
COPPER
Solvent extraction of nickel and copper from laterite-ammoniacal leach liquors
[PB82-176587] N82-33518
COPPER ALLOYS
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501
Studies on age-hardening in spinodally modulated alloys, experimental and theoretical
[DE82-007957] N82-33506
COPPER OXIDES
Aluminum/cuprous oxide thermite
[DE82-012866] N82-33514
CORIOLIS EFFECT
Activities in planetary geology for the physical and earth sciences
[NASA-EP-179] N82-33789
CORONAL LOOPS
On the thermal stability of coronal loop plasma
[NASA-CR-169347] N82-34327
CORRELATION
An assessment of heat-transfer correlations for turbulent water flow through a pipe at Prandtl numbers of 6.0 and 11.6
[DE82-014426] N82-33677
Investigate the time evolution of the correlation between bathymetry and geoid height in the Pacific Ocean
[PB82-172099] N82-33944
On the correlation of a group of rankings with an external ordering relative to the internal concordance
[AD-A117232] N82-34170
CORRELATION COEFFICIENTS
Repeated measures of human performance: A bag of research tools
[AD-A113954] N82-34084
Related correlation coefficients
[AD-A117231] N82-34169
CORROSION
Assessment of the field status of active solar systems. Volume 2: Appendices
[DE82-016032] N82-33878
CORROSION PREVENTION
Influence of sulfation-enhanced salt additives on the corrosion behavior of materials in atmospheric fluidized-bed combustors
[DE82-010204] N82-33670
Assessment of the field status of active solar systems. Volume 2: Appendices
[DE82-016032] N82-33878
CORROSION RESISTANCE
Effect of simulated medium-Btu coal-gasifier atmospheres on the biaxial stress-rupture behavior of four candidate coal-gasifier alloys
[DE82-010614] N82-33507
Microstructural analysis of austenitic stainless steel welds and their modification during laser welding
[DE82-016036] N82-33515
Long-term materials test program: Materials exposure test plan
[DE82-013322] N82-33516
Screening tests of conformally-coated printed wiring boards
[DE82-012873] N82-33656
Investigations on the improvement of corrosion resistance and strength of ribbed reinforcing steel bars in concrete, especially when subject to fatigue loading
[PB82-204330] N82-33787
CORROSION TESTS
Stress corrosion characterization of turbine rotor materials, phase 1
[DE82-902070] N82-33508
Five OTEC biofouling and corrosion experiments at Keahole Point, 1976 to 1980
[DE82-008086] N82-33987
COST ANALYSIS
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil, part 5
[AD-A117438] N82-33551
Residential heating and cooling loads and costs for the South
[DE82-009504] N82-33853
Preliminary design and economic investigations of Diffuser Augmented Wind Tubines (DAWT)
[DE82-008475] N82-33854
Distributed versus centralized database systems: Transaction execution cost and performance analysis
[AD-A117915] N82-34097
Figures of merit: Use and interpretation in evaluating program alternatives
[AD-A117233] N82-34295
COST EFFECTIVENESS
Preliminary analysis of the benefits and costs to implement the National Airspace System Plan
[AD-A117664] N82-33369
COST ESTIMATES
Preliminary analysis of the benefits and costs to implement the National Airspace System Plan
[AD-A117664] N82-33369
COST REDUCTION
Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs and improve readiness
[AD-A117935] N82-34296
COULOMB POTENTIAL
Importance of elastic scattering to particle direction determination in Monte Carlo calculations of DT reactions in flight
[DE82-015080] N82-34210
COUNTERMEASURES
Attenuation of high intensity reradiated light by photochromic glass
[AD-A117424] N82-34227
COUPLED MODES
Susceptibility of symmetric structures to nonlinear torsional coupling N82-33759
COUPLING
Responses of FM/CW systems having filters
[AD-A117400] N82-33621
Inelastic strong interactions at high energies
[DE82-007984] N82-34215
COVERALLS
Blue Flight Coverall Program
[AD-A116856] N82-34082
CRACK INITIATION
Fatigue behaviour of advanced structural aluminium alloy 74575-T761 --- for aircraft construction
[TAE-447] N82-33492
A preliminary study of crack initiation and growth at stress concentration sites
[NASA-CR-169358] N82-33738
An example of the effect of hydrogen trapping on hydrogen embrittlement
[AD-A116299] N82-34106
CRACK PROPAGATION
Fracture mechanics of delamination: Initiation and growth
[AD-A115728] N82-33438
Hygrothermal effects on the micromechanisms of crack extension in glass fibre and carbon fibre composites
[PB82-176728] N82-33447
Mechanics of surface damage in elastohydrodynamic contacts
[AD-A117458] N82-33537
A preliminary study of crack initiation and growth at stress concentration sites
[NASA-CR-169358] N82-33738
Numerical analysis of hydraulically-driven fractures
[DE82-015501] N82-33939
CRACKING (FRACTURING)
Effects of residual impurities on hydrogen assisted cracking in high strength steels
[AD-A116966] N82-33497
Effects of residual impurities on hydrogen assisted cracking in high strength steels, part 1
[AD-A116948] N82-33498
Elastic/plastic finite element analysis of a single edge-cracked beam subjected to mode 1 tensile loading
[AD-A117622] N82-33773
Reinforced concrete modeling
[AD-A117925] N82-33775
Finite-element analysis of some full- and partial-ring crack-propagation test specimens
[AD-A117674] N82-33783
CRACKS
Probabilistic environmental model for solid rocket motor life prediction
[AD-A117651] N82-33427
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium
[DE82-009289] N82-33673
CRASHES
Examination of aircraft interior emergency lighting in a postcrash fire environment
[AD-A117629] N82-33360
CRASHWORTHINESS
Results from tests of three prototype general aviation seats
[NASA-TM-84533] N82-33733
Crashworthy airframe design concepts: Fabrication and testing
[NASA-CR-3603] N82-33735
CRATERING
Activities in planetary geology for the physical and earth sciences
[NASA-EP-179] N82-33789
CREATIVITY
On the modelling of creative behavior
[AD-A116896] N82-34027
CREEP RUPTURE STRENGTH
Effect of simulated medium-Btu coal-gasifier atmospheres on the biaxial stress-rupture behavior of four candidate coal-gasifier alloys
[DE82-010614] N82-33507
CREW STATIONS
A systems approach for crew station design and evaluation
[AD-A115663] N82-34080

CREWS
Microclimate cooling for combat vehicle crewmen
[AD-A117156] N82-34083
CROP IDENTIFICATION
Evaluation of spatial filtering on the accuracy of wheat area estimate
[E82-10292] N82-33792
CROP INVENTORIES
Evaluation of spatial filtering on the accuracy of wheat area estimate
[E82-10292] N82-33792
CROPS
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes
[DE82-903730] N82-33898
CROSS FLOW
Density measurement in air with saturable absorbing seed gas
[NASA-CR-169420] N82-33919
Vortex shedding from cylinders and the resulting unsteady forces and flow phenomenon, part 1
N82-34338
CROSSLINKING
The effects of processing conditions on the reliability of cross-linked polyethylene cable insulation
[DE82-011712] N82-33543
CRUDE OIL
Preliminary study of in-situ combustion in diatomites
[DE82-013272] N82-33862
Establishing a reliable source of fuel for Department of Defense requirements: Effective petroleum, oil and lubricant financial management
[PB82-170812] N82-34299
CRUISE MISSILES
Investigation into Air Launch Cruise Missile (ALCM) flight information loading and display techniques during flex targeting procedure
[AD-A115744] N82-33376
CRUSHING
Evaluation of the use of foam for dust control on face drills and crushers
[PB82-176215] N82-33809
CRYOGENIC EQUIPMENT
The aerospace long-path multiple reflection cell facility
[SD-TR-82-60] N82-34218
CRYOGENIC WIND TUNNELS
Cryogenic wind tunnels: A selected, annotated bibliography
[NASA-TM-84474] N82-33405
CRYSTAL DISLOCATIONS
Studies on age-hardening in spinodally modulated alloys, experimental and theoretical
[DE82-007957] N82-33506
CRYSTAL GROWTH
Optical Studies of model binary miscibility gap system
[NASA-TM-82494] N82-33683
Ice forming experiment
[NASA-CR-170623] N82-33948
Resolution of factors responsible for difficulty in growing single crystals of YAG
[AD-A117401] N82-34279
Large plate CdTe synthesis by sealed vessels transport
[AD-A117524] N82-34286
CRYSTAL LATTICES
Multi-ion interactions and defects in metals
[AD-A117451] N82-33502
Charge penetration effects in rare-earth crystal fields
[AD-A117494] N82-34283
CRYSTAL STRUCTURE
Large plate CdTe synthesis by sealed vessels transport
[AD-A117524] N82-34286
Diffraction and microscopy studies of the structure of grain boundaries in Fe, Fe-base alloys, and ceramic materials
[DE82-009553] N82-34287
CRYSTALS
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472
Development of host crystals for Ce(+3) blue and blue-green solid-state lasers
[AD-A117899] N82-33710
Central limit theorems in the area of large deviations for some dependent random variables
[AD-A117714] N82-34155
CULTURE TECHNIQUES
Aeration-agitation control based on a mathematical model of the fermentation process
[NRC/CNR-TT-2029] N82-33461
Technique for the aerobic cultivation of microorganisms in water-in-oil emulsions
[NRC/CNR-TT-2031] N82-33980
CUMULUS CLOUDS
A dynamical model for prediction of formation, growth and dissipation of a cloud
[AD-A117452] N82-33955
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 2: The FACE-2 confirmatory radar rainfall and covariate data sets
[PB82-172131] N82-33963
CURING
Dynamic mechanical analysis and organization/storage of data for polymetric materials
[NASA-CR-166413] N82-33527
Ultraviolet-radiation-curable paints
[DE82-015717] N82-33545
CURRENT SHEETS
Simple method of sheet plasma production for high current negative ion II (curved sheet plasma)
[IPPJ-597] N82-34240
CURVES (GEOMETRY)
A mixed formulation finite element for linear thin shell analysis N82-33753
Measuring the fracture dimensions of empirical cartographic curves
[AD-A117498] N82-33804
CYANATES
Development of tough, moisture resistant laminating resins
[NASA-CR-3615] N82-33432
CYCLES
System optimization by periodic control
[AD-A117815] N82-33402
CYCLOHEXANE
High pressure NMR studies of the dynamic structure of liquids N82-33450
CYCLOTRON RESONANCE
Effect of magnetic shear on the electrostatic ion cyclotron waves in magnetospheric plasmas
[NASA-CR-169229] N82-34183
CYCLOTRON RESONANCE DEVICES
Near millimeter wave radiation from a gyromonotron
[AD-A117301] N82-33703
CYLINDRICAL BODIES
Vibrations of axially loaded stiffened cylindrical panels with elastic restraints
[TAE-439] N82-33730
Dynamic response of lined tunnels by boundary elements N82-33755
Stirling engine with one adiabatic cylinder
[DE82-009606] N82-33849
CYLINDRICAL SHELLS
Further initial imperfection measurements of integrally Stringer stiffened cylindrical shell, series 2
[TAE-404] N82-33731
CZOCHRALSKI METHOD
Three-dimensional numerical studies of the physics of semiconductor crystal growth
[AD-A116861] N82-34277

D

DAMAGE
Investigation of aircrew protection during emergency escape at dynamic pressures up to 1600 Q
[AD-A117552] N82-33359
Damage accumulation during fatigue of composites
[PB82-182312] N82-33445
Mechanics of surface damage in elastohydrodynamic contacts
[AD-A117458] N82-33537
DAMPING
Rotorcraft blade mode damping identification from random responses using a recursive maximum likelihood algorithm
[NASA-CR-3600] N82-33373
A computer package for the design and eigenproblem solution of damped linear multidegree of freedom systems N82-33764
DATA ACQUISITION
Reliability, Availability, Maintainability Data Tracking Plan improved GUARDRAIL 5
[AD-A117933] N82-33378
Applicability of factor analysis to the determination of mineral matter in coal N82-33790
Intermediate photovoltaic system application experiment operational performance. Volume 6: Newman Power Station, El Paso, Texas
[DE82-008483] N82-33846
Intermediate photovoltaic system application experiment operational performance. Volume 8: Newman Power Station, El Paso, Texas
[DE82-014247] N82-33858
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865
Data report for the Northwest Residential Experiment Station, December 1981
[DE82-016027] N82-33868
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Beverly High School, Beverly, Mass.
[DE82-008622] N82-33879
Methods and techniques of experimental research on the atmosphere (selected articles)
[AD-A117570] N82-33933
Environmental data for sites in the national solar data network
[DE82-008076] N82-33959
Exposure to atmospheric benzene vapour associated with motor gasoline
[PB82-174244] N82-34025
Ensemble averaging of acoustic data N82-34102
Sonic boom measurement test plan for Space Shuttle STS-2 reentry
[NASA-TM-84858] N82-34186
Improving government information resources management
[PB82-183542] N82-34305
Analysis of space telescope data collection system
[NASA-CR-162090] N82-34322
DATA BASE MANAGEMENT SYSTEMS
Computer storage and retrieval of position: Dependent data
[AD-A116767] N82-34095
An architecture for database management standards
[PB82-176322] N82-34099
DATA BASES
Study of the frequency assignment congestion in the ultra high frequency air traffic control air/ground communication band
[AD-A117640] N82-33368
Residential solar data center: Data resources and reports
[PB82-180845] N82-33883
Energy laboratory data and model directory
[PB82-180274] N82-33884
Biodynamic data bank feasibility study
[AD-A117921] N82-34020
Distributed versus centralized database systems: Transaction execution cost and performance analysis
[AD-A117915] N82-34097
Virtual information facility of the INFOPLEX software test vehicle, part 1
[AD-A116502] N82-34104
Virtual information facility of the INFOPLEX software test vehicle, part 2
[AD-A116503] N82-34105
Catalog of infrared observations
[NASA-TM-83819] N82-34319
DATA COMPRESSION
Graphic/symbol segmentation for Group 4 facsimile systems
[AD-A117026] N82-33684
Measuring the fracture dimensions of empirical cartographic curves
[AD-A117498] N82-33804
Data compression for transient measurements
[AD-A117100] N82-34093
Optical computations for image bandwidth compression
[AD-A117722] N82-34233
DATA PROCESSING
Numerical solution of an ill-posed problem arising in wind tunnel heat transfer data reduction
[AD-A117572] N82-33409
SEASAT satellite radar altimetry data processing system
[AD-A115972] N82-33797
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
Analysis of remote sensing data collected for detection and mapping of oil spills: Reduction and analysis of multi-sensor airborne data of the NASA Wallops oil spill exercise of November 1978
[NASA-CR-165886] N82-33891
AVHRR measurements of atmospheric aerosols over oceans
[PB82-172115] N82-33945
The Georgia Institute of Technology research program in fully distributed processing systems
[AD-A116955] N82-34089
Ensemble averaging of acoustic data N82-34102
Distributed minimum hop algorithms
[AD-A117808] N82-34151
DATA RECORDING
Graphic/symbol segmentation for Group 4 facsimile systems
[AD-A117026] N82-33684

DATA REDUCTION
Analysis of remote sensing data collected for detection and mapping of oil spills: Reduction and analysis of multi-sensor airborne data of the NASA Wallops oil spill exercise of November 1978
[NASA-CR-165886] N82-33891
AVHRR measurements of atmospheric aerosols over oceans
[PB82-172115] N82-33945
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 4: FACE-2 microphysical data for analyses of seeded and unseeded cumulus towers
[PB82-172149] N82-33964
Data compression for transient measurements
[AD-A117100] N82-34093
DATA RETRIEVAL
Computer storage and retrieval of position: Dependent data
[AD-A116767] N82-34095
DATA STORAGE
Nearly on line scheduling of multiprocessor systems with memories
[AD-A116823] N82-34090
Computer storage and retrieval of position: Dependent data
[AD-A116767] N82-34095
DATA STRUCTURES
Data flow computer architecture
[DE82-014632] N82-34098
DATA SYSTEMS
An architecture for database management standards
[PB82-176322] N82-34099
DATA TRANSMISSION
HF wideband modem
[AD-A116859] N82-33603
Improved microprocessor design
[AD-A110858] N82-34088
Distributed minimum hop algorithms
[AD-A117808] N82-34151
DC 10 AIRCRAFT
Advanced turboprop testbed systems study
[NASA-CR-167895] N82-33375
DECAMETRIC WAVES
A theory of the Io phase asymmetry of the Jovian decametric radiation
[NASA-TM-83994] N82-34325
DECISION MAKING
An approach to describing the functional requirements of an embedded communication system
[AD-A115738] N82-33598
A theory of diagnostic interference. 1: Imagination and the psychophysics of evidence
[AD-A115940] N82-34026
Sixteenth Annual Conference on Manual Control
[NASA-TM-84273] N82-34037
Combined discrete network. Continuous control modelling of operator behavior N82-34064
A model of human decision making in multiple process monitoring situations N82-34065
PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066
Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-34067
Supervision of dynamic systems: Monitoring, decision-making and control N82-34069
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 1: Study results
[NASA-CR-165975] N82-34129
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 2, Part 2: Appendixes B, C, D and E
[NASA-CR-165977] N82-34131
A system for assessing user response to NAVPERRANDCEN RDT/E products
[AD-A117719] N82-34297
Basic techniques in availability engineering
[DE82-903666] N82-34298
DECISION THEORY
A theory of diagnostic interference. 1: Imagination and the psychophysics of evidence
[AD-A115940] N82-34026
DECOMPOSITION
Determination of carbon monoxide in air by triple quadrupole mass spectrometry
[AD-A117443] N82-33470
DECONTAMINATION
Resolution of contamination problems affecting laser surface certification inspection
[DE82-008775] N82-33711
Wall conditioning of the JIPP T-II Torus by ac discharge cleaning
[IPPJ-595] N82-34246
DEEP SCATTERING LAYERS
Bioelectric fields: Their sources, nature and purpose N82-33991
DEFECTS
Multi-ion interactions and defects in metals
[AD-A117451] N82-33502
Further initial imperfection measurements of integrally Stringer stiffened cylindrical shell, series 2
[TAE-404] N82-33731
DEFENSE PROGRAM
The Department of Defense statement on the science and technology program by Mr. H. Mark Grove, Assistant Deputy Under Secretary of Defense for Research and Advanced Technology before the Defense Subcommittee of the Committee on Appropriations of the United States House of Representatives, 97th Congress, second session
[AD-A116788] N82-34339
DEFLECTION
Solution of Von Karman's plate equation with perturbation and series summation N82-33761
Analyses of beams constructed of nonlinear materials having different behavior in tension and compression
[AD-A117944] N82-33777
DEFORMATION
Operator split methods in the numerical solution of the finite deformation elastoplastic dynamic problem N82-33742
DEGRADATION
Surveillance report. Stage 1: Dissected motors. Phase 13: Propellant and component testing
[AD-A117604] N82-33426
DEGREES OF FREEDOM
Research in structural and solid mechanics, 1982
[NASA-CP-2245] N82-33739
Application of the reduced basis method to nonlinear transient thermal analysis N82-33743
An exact zooming method for finite element analyses N82-33754
A finite element approach for shells of revolution with a local deviation N82-33756
A computer package for the design and eigenproblem solution of damped linear multidegree of freedom systems N82-33764
DELAMINATING
Fracture mechanics of delamination: Initiation and growth
[AD-A115728] N82-33438
DELAY
A new analysis of the unwinding ribbon as a delayed arming device
[AD-A117352] N82-33571
DELTA WINGS
Euler solutions of supersonic wing-body interference at high incidence including vortex effects
[NEAR-TR-263] N82-33341
Trailing vortices in stratified fluids
[AD-A117040] N82-33352
DENSITY (MASS/VOLUME)
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354
DENSITY DISTRIBUTION
Some computer applications and digital image processing in nuclear medicine N82-34000
DEOXIDIZING
Wall conditioning of the JIPP T-II Torus by ac discharge cleaning
[IPPJ-595] N82-34246
DEPENDENCE
A concept of negative dependence using stochastic ordering
[AD-A116888] N82-34164
DEPENDENT VARIABLES
Central limit theorems in the area of large deviations for some dependent random variables
[AD-A117714] N82-34155
DEPOSITION
Field survey of float dust in coal mining operations
[PB82-172719] N82-33812
Growth of HgCdTe by modified molecular beam epitaxy
[AD-A117752] N82-34199
Ultraviolet enhanced deposition from pentacarbonyl-iron on gallium arsenide, quartz, and sapphire
[AD-A116800] N82-34278
DEPTH
Ultrasonic measurement of case depth in case hardened steels. Evaluation of feasibility for the ultrasonic measurement of case depth in case hardened steels
[AD-A117901] N82-33505
A theoretical appraisal of the joint effects of turbulence and of Langmuir circulations on the dispersion of oil spilled in the sea
[AD-A117844] N82-33894
DESERTS
A dynamical model for prediction of formation, growth and dissipation of a cloud
[AD-A117452] N82-33955
DESIGN ANALYSIS
Stress distribution and pillar design in oil shale retorts
[PB82-176256] N82-33582
Near millimeter wave radiation from a gyromonotron
[AD-A117301] N82-33703
Superconducting Magnetic Energy Storage (SMES) Program
[DE82-009083] N82-33848
Preliminary design and economic investigations of Diffuser Augmented Wind Tubines (DAWT)
[DE82-008475] N82-33854
The application of US upper-wind data in one design of tethered wind energy systems
[DE82-012880] N82-33962
Information display systems. Summary of project status
[DE82-009971] N82-34304
DESORPTION
Thermal desorption of H2 and CO on Pt/TiO2
[AD-A117888] N82-33466
Desorption and related phenomena relevant to fusion devices
[IPPJ-AM-22] N82-34234
DETECTION
Adaptive sampling for enhanced performance of an ion detection system for a triple quadupole mass spectrometer
[AD-A117441] N82-33471
DETONATION
A study of detonation structure: The formation of unreacted gas pockets
[AD-A117849] N82-33553
DEUTERIUM
Thermal desorption of H2 and CO on Pt/TiO2
[AD-A117888] N82-33466
DEVELOPING NATIONS
Design description of the Tangaye Village photovoltaic power system
[NASA-TM-82917] N82-33828
DEVIATION
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672
DIAGNOSIS
Fault diagnosis of nonlinear analog circuits. Volume 1. DC diagnosis of hard failures
[AD-A117567] N82-33645
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) laboratory test results
[AD-A114073] N82-34012
DIAMAGNETISM
Research support for plasma diagnostics on Elmo Bumpy diamagnetic measurements for the electron rings and development of a ferromagnetic resonance magnetometer
[DE82-007245] N82-34259
Calibration of a diamagnetic diagnostic for stored energy of high-temperature electron annuli in Elmo Bumpy Torus (EBT)
[DE82-015235] N82-34271
DIATOMIC MOLECULES
Preliminary study of in-situ combustion in diatomites
[DE82-013272] N82-33862
DICTIONARIES
Dictionary of missile and artillery terms
[AD-A115995] N82-33414
NATO glossary of terms and definitions (English and French)
[AD-A117715] N82-34290
DIELECTRICS
Dielectric waveguide antenna
[AD-A117305] N82-33609
Waveguide Y-circulator
[AD-A112086] N82-33637
DIES
Computer-aided design, drawing and manufacturing system for dies and molds
[NRC/CNR-TT-2030] N82-34101
DIESEL FUELS
Research on fire-resistant diesel fuel
[AD-A117408] N82-33550
Potential health and environmental effects of light-duty diesel vehicles, 2
[DE82-014390] N82-33901
DIFFERENTIAL EQUATIONS
A computer package for the design and eigenproblem solution of damped linear multidegree of freedom systems N82-33764
Numerical analysis of hydraulically-driven fractures
[DE82-015501] N82-33939
Algebraic tests for functional controllability of functional differential equation systems
[AD-A117032] N82-34149

DIFFRACTION
The AIDS/F-18 diffractive HUD
[AD-A116026] N82-33382
Diffraction and microscopy studies of the structure of grain boundaries in Fe, Fe-base alloys, and ceramic materials
[DE82-009553] N82-34287
DIFFUSION
Workshop on Diffuse Discharge Opening Switches
[AD-A115883] N82-33640
A theoretical appraisal of the joint effects of turbulence and of Langmuir circulations on the dispersion of oil spilled in the sea
[AD-A117844] N82-33894
Viscosity dependence of the rates of diffusional processes
[NASA-CR-166394] N82-33982
DIGITAL DATA
Registration of digitized aerial photography with a digital map data base
[AD-A117510] N82-33803
DIGITAL SIMULATION
Some computer applications and digital image processing in nuclear medicine N82-34000
DIGITAL SYSTEMS
The CRITTER system: Analyzing digital circuits by propagating behavior and specifications
[AD-A117887] N82-33650
Applying photogrammetry to real time collection of digital image data
[AD-A116770] N82-33687
Ensemble averaging of acoustic data N82-34102
Interactive digital image processing for terrain data extraction
[AD-A116881] N82-34107
DIGITAL TECHNIQUES
Digital communications techniques and equipment for law enforcement use
[PB82-195496] N82-33632
Some computer applications and digital image processing in nuclear medicine N82-34000
DIODES
Pinch-reflex-diode scaling on the aurora pulser
[AD-A116055] N82-33638
DIRECT CURRENT
Summary of electric vehicle dc motor-controller tests
[NASA-TM-82863] N82-33636
DIRECT POWER GENERATORS
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-009398] N82-33842
DIRECTION FINDING
Methods for 2-beam array processing
[AD-A116880] N82-33605
DISCONNECT DEVICES
The 1200-kV system study
[DE82-014512] N82-33659
DISKS
Thermal effects in rolling/sliding contact
[AD-A117702] N82-33719
DISPERSIONS
A theoretical appraisal of the joint effects of turbulence and of Langmuir circulations on the dispersion of oil spilled in the sea
[AD-A117844] N82-33894
DISPLACEMENT MEASUREMENT
An exact zooming method for finite element analyses N82-33754
Synthesis of frameworks under multilevel performance constraints N82-33757
DISPLAY DEVICES
The AIDS/F-18 diffractive HUD
[AD-A116026] N82-33382
Non-complex item development specification for a feasibility model of an electronic master monitor and advisory display system (EMMADS)
[AD-A117919] N82-33386
Speech Command Auditory Display System (SCADS)
[AD-A117486] N82-33387
Intagliated phosphor screen image tube project
[NASA-CR-170445] N82-33635
An automated optical display system for visual physiology experiments
[AD-A116499] N82-34004
A gunner model for an AAA tracking task with interrupted observations N82-34039
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle N82-34062
Separation monitoring with four types of predictors on a cockpit display of traffic information N82-34063
Evaluation of SMART sensor displays for multidimensional precision control of Space Shuttle remote manipulator N82-34074
Evaluation of four-color plan view display console
[AD-A117897] N82-34085
Analysis of interactive graphics display equipment for an automated photo interpretation system
[AD-A117647] N82-34115
Information display systems. Summary of project status
[DE82-009971] N82-34304
DISSIPATION
A dynamical model for prediction of formation, growth and dissipation of a cloud
[AD-A117452] N82-33955
DISSOCIATION
Development of a long-life high-temperature catalyst for the SO2/SO3 energy-storage system
[DE82-009723] N82-33840
DISTANCE
Effects of motivation on car-following N82-34070
DISTRIBUTED PARAMETER SYSTEMS
The Georgia Institute of Technology research program in fully distributed processing systems
[AD-A116955] N82-34089
Finite difference approximations and stability of distributed parameter systems
[PB82-177635] N82-34158
DISTRIBUTED PROCESSING
Enhancements and algorithms for avionic information processing system design methodology
[AD-A117948] N82-33385
Distributed versus centralized database systems: Transaction execution cost and performance analysis
[AD-A117915] N82-34097
DISTRIBUTION FUNCTIONS
Bayes adaptive estimation of the point of shift to the wear-out phase of reliability systems
[AD-A117865] N82-33725
Utilization of quantum distribution functions for ultra submicron device transport
[AD-A117433] N82-34280
DIURNAL VARIATIONS
A general climatological guide to daily freezing conditions: Frost days, ice days and freeze-thaw days
[AD-A116771] N82-33952
DIVERTERS
Formation of magnetic islands and ergodic magnetic layers in wall-lapping plasma as a non-divertor concept for a reactor-relevant Tokamak
[IPPJ-587] N82-34238
DIVING (UNDERWATER)
Effect of local vibration on divers working under water N82-33992
Influence of the diving response and submersion on the breath-holding time in man N82-33998
DOCUMENTATION
Survey of reader preferences concerning the format of NASA technical reports
[NASA-TM-84502] N82-34300
DOCUMENTS
An approach to describing the functional requirements of an embedded communication system
[AD-A115738] N82-33598
DOPED CRYSTALS
The planar doped barrier: A new class of electronic devices
[AD-A117307] N82-33644
Development of host crystals for Ce(+3) blue and blue-green solid-state lasers
[AD-A117899] N82-33710
DOPPLER EFFECT
The mean and variance of skywave radar sea-echo power spectra for discrete ionospheric multipath
[PB82-174236] N82-33631
Doppler spectra of sea-surface backscatter at high acoustic frequencies
[AD-A117682] N82-33978
DOSAGE
Variations in noise dosimeter readings of fluctuating noise
[AD-A115763] N82-34002
DOSIMETERS
Variations in noise dosimeter readings of fluctuating noise
[AD-A115763] N82-34002
Tables of energy-deposition distributions in water phantoms irradiated by point-monodirectional electron beams with energies from 1 to 60 MeV, and applications to broad beams
[PB82-178716] N82-34023
DRAG
Wind-tunnel drag measurements of a ball-obturated tubular projectile
[AD-A117268] N82-33351
DRAG REDUCTION
NASA research on viscous drag reduction
[NASA-TM-84518] N82-33344
DRAINAGE
Irregular wave runup on smooth slopes
[AD-A113648] N82-33975
DREDGED MATERIALS
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
DRILLING
An evaluation of 3 wet dust control techniques for face drills
[PB82-177320] N82-33808
Evaluation of the use of foam for dust control on face drills and crushers
[PB82-176215] N82-33809
DROP SIZE
Atomization characteristics of coal-water mixtures
[DE82-009093] N82-33477
The multi-parameter remote measurement of rainfall
[NASA-TM-83971] N82-33947
DROPS (LIQUIDS)
Ice forming experiment
[NASA-CR-170623] N82-33948
DRUGS
Dosimetric and behavioral analysis of microwave-drug synergistic effects on operant behavior in the rat
[AD-A115115] N82-33986
DUCT GEOMETRY
Energy efficient engine: Turbine transition duct model technology report
[NASA-CR-167996] N82-33394
DUCTED FLOW
Interaction of oscillations of channel flow and flow separation at duct discontinuities
[AD-A116801] N82-33666
Separated diffuser flow analysis, volume 1
[AD-A117668] N82-33669
DUCTILITY
A study of the nature of solid particle impact and shape on the erosion morphology of ductile metals
[NASA-TM-82933] N82-33493
DUCTS
In-situ measurement of particulate in turbulent duct flows
[DE82-010291] N82-33671
DURABILITY
Durability of reinforced concrete beams exposed to marine environment
[AD-A117284] N82-33768
Durability of post-tensioned concrete beams exposed to severe natural weathering
[AD-A13130] N82-33769
DUST
An evaluation of 3 wet dust control techniques for face drills
[PB82-177320] N82-33808
Evaluation of the use of foam for dust control on face drills and crushers
[PB82-176215] N82-33809
Field survey of float dust in coal mining operations
[PB82-172719] N82-33812
DYNAMIC CHARACTERISTICS
Rolling flow wind tunnel tests of F-18 aircraft
[NASA-CR-169344] N82-33338
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-169352] N82-33374
Constrained multibody system dynamics: An automated approach N82-33762
Does man always close the loop in trying to pilot a large ship? N82-34068
Supervision of dynamic systems: Monitoring, decision-making and control N82-34069
Analysis of driver performance under reduced visibility N82-34075
Application of control theory to dynamic systems simulation
[NASA-CR-166383] N82-34077
DYNAMIC LOADS
Program package for nonlinear analysis of reinforced concrete structures
[PB82-204744] N82-33585
DYNAMIC MODELS
Electrical energy consumption and heating requirements of municipal wastewater treatment plants
[PB82-183393] N82-33882
A dynamical model for prediction of formation, growth and dissipation of a cloud
[AD-A117452] N82-33955
Supervision of dynamic systems: Monitoring, decision-making and control N82-34069
DYNAMIC PRESSURE
Results of buffet tests in a cryogenic wind tunnel
[NASA-TM-84520] N82-33342
DYNAMIC RESPONSE
High pressure NMR studies of the dynamic structure of liquids N82-33450

Design and laboratory testing of a prototype linear temperature sensor
[AD-A117245] N82-33688
Research in structural and solid mechanics, 1982
[NASA-CP-2245] N82-33739
Dynamic response of lined tunnels by boundary elements N82-33755
A dynamic model of the cervical spine and head
[AD-A114887] N82-34008
Dynamic response of vertebral elements response of the intervertebral joint to torsion
[AD-A115125] N82-34016
Vortex shedding from cylinders and the resulting unsteady forces and flow phenomenon, part 1 N82-34338

DYNAMIC STABILITY
Constrained multibody system dynamics: An automated approach N82-33762

DYNAMIC STRUCTURAL ANALYSIS
The Shock and Vibration Digest, volume 13, no. 10
[AD-A106486] N82-33727
Recent progress in the dynamic plastic behavior of structures, part 3 N82-33728
Operator split methods in the numerical solution of the finite deformation elastoplastic dynamic problem N82-33742
Application of a boundary element method to the study of dynamical torsion of beams N82-33747
A simulation language approach to structural interaction problems N82-33758

E

EARTH (PLANET)
High precision tidal gravity
[AD-A116941] N82-33934

EARTH CRUST
Estimates of crustal transmission losses using MLM array processing
[AD-A117278] N82-33929
Three-dimensional velocity structure of the crust and upper mantle beneath the Nevada test site
[AD-A114241] N82-33932

EARTH MANTLE
Interpretation of the Earth's gravity field N82-33911

EARTH MOVEMENTS
Evaluation of techniques for predicting soil liquefaction and verification of field techniques to predict in situ shear wave velocity
[PB82-168444] N82-33581
Platonic plate tectonics: On the regularity of the distribution of triple points on the Earth's surface
[AD-A113777] N82-33931
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981
[PB82-176967] N82-33966

EARTH PLANETARY STRUCTURE
Platonic plate tectonics: On the regularity of the distribution of triple points on the Earth's surface
[AD-A113777] N82-33931

EARTH RADIATION BUDGET EXPERIMENT
Use of the Charge/Discharge (C/D) ratio to aument voltage limit (V sub T) charge control in the ERBS spacecraft
[NASA-TM-83991] N82-33824

EARTH RESOURCES
Terrestrial biological inventory, Hillview Drainage and Levee District, Greene and Scott Counties, Illinois
[AD-A115911] N82-33800

EARTHQUAKES
Seismic waves N82-33563
Evaluation of techniques for predicting soil liquefaction and verification of field techniques to predict in situ shear wave velocity
[PB82-168444] N82-33581
Seafloor earthquake measurement system. Volume 2: Electronic hardware description
[DE82-009319] N82-33942

ECCENTRICITY
Longitudinal shrinkage of eccentric single-pass welds
[PB82-174731] N82-33720

ECONOMIC ANALYSIS
An assessment of the impact of the Department of Defense very high speed integrated circuit program
[AD-A117459] N82-33646
Superconducting Magnetic Energy Storage (SMES) Program
[DE82-009083] N82-33848
Preliminary design and economic investigations of Diffuser Augmented Wind Tubines (DAWT)
[DE82-008475] N82-33854
Assessment of a coal-gasification fuel-cell system for utility application
[DE82-903667] N82-33870
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary
[DE82-008345] N82-33877

ECONOMIC DEVELOPMENT
Design description of the Tangaye Village photovoltaic power system
[NASA-TM-82917] N82-33828

ECONOMIC FACTORS
Private financing and operation of a space station: Investment requirements, risk, government support and other primary business management considerations
[NASA-CR-169357] N82-34291

ECONOMIC IMPACT
Human capital adjustments to technological change in the computer industry: The case of scientists and engineers
[PB82-180969] N82-34036

ECONOMICS
Competition in the photovoltaics industry: A question of balance
[PB82-171570] N82-33886

ECUADOR
Overseas Geology and Mineral Resources, number 55. Outline of the geology of Ecuador
[PB82-172784] N82-33815
Overseas Geology and Mineral Resources, number 58. An annotated bibliography of Ecuadorian geology
[PB82-172768] N82-33816

EDUCATION
Human capital adjustments to technological change in the computer industry: The case of scientists and engineers
[PB82-180969] N82-34036

EFFLUENTS
Sampling of liquid effluents from refineries
[PB82-174657] N82-33906

EIGENVALUES
Constrained multibody system dynamics: An automated approach N82-33762
Simple way of solving the hydrogen atom problem
[DE82-700020] N82-34204
Lax-pair operators for squared eigenfunctions in the inverse scattering transformations
[IPPJ-589] N82-34244

EIGENVECTORS
Constrained multibody system dynamics: An automated approach N82-33762
A computer package for the design and eigenproblem solution of damped linear multidegree of freedom systems N82-33764
Simple way of solving the hydrogen atom problem
[DE82-700020] N82-34204

EJECTION SEATS
Investigation of aircrew protection during emergency escape at dynamic pressures up to 1600 Q
[AD-A117552] N82-33359

EJECTORS
Diffuser/ejector system for a very high vacuum environment
[NASA-CASE-MFS-15791-1] N82-33712

ELASTIC ANISOTROPY
Advances and trends in plate buckling research N82-33760

ELASTIC PROPERTIES
Effect of specimen size on the fracture toughness of Type 304 stainless steel
[DE82-012517] N82-33517
A finite element approach for shells of revolution with a local deviation N82-33756
Synthesis of frameworks under multilevel performance constraints N82-33757
Elastic/plastic finite element analysis of a single edge-cracked beam subjected to mode 1 tensile loading
[AD-A117622] N82-33773
Analyses of beams constructed of nonlinear materials having different behavior in tension and compression
[AD-A117944] N82-33777
The analysis of elastic-plastic deformation and stress at finite strain and their evaluation
[AD-A117505] N82-33779
NASTRAN and FEARS analysis of two problems of plane elasticity
[AD-A117713] N82-33782
Semirigid coaxial RF cable bending techniques
[DE82-016029] N82-33785

ELASTIC SCATTERING
Central production and small-angle elastic scattering in the valon model
[DE82-008367] N82-34205
High energy hadron-hadron collisions
[DE82-011255] N82-34206
Importance of elastic scattering to particle direction determination in Monte Carlo calculations of DT reactions in flight
[DE82-015080] N82-34210

ELASTOHYDRODYNAMICS
Mechanics of surface damage in elastohydrodynamic contacts
[AD-A117458] N82-33537

ELASTOPLASTICITY
Research in structural and solid mechanics, 1982
[NASA-CP-2245] N82-33739
Operator split methods in the numerical solution of the finite deformation elastoplastic dynamic problem N82-33742

ELECTRIC BATTERIES
Raman spectroscopy for in-situ monitoring of electrode processes
[DE82-014909] N82-33486
Calcium inorganic electrolyte battery development
[AD-A115956] N82-33831
Nickel-zinc batteries for RPV applications
[AD-A115843] N82-33832
High energy surfuryl chloride batteries
[AD-A117106] N82-33833
Properties of SOC12 electrolyte solutions
[AD-A117306] N82-33834
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory
[DE82-010867] N82-33866

ELECTRIC CHARGE
Charge penetration effects in rare-earth crystal fields
[AD-A117494] N82-34283

ELECTRIC COILS
Formation of magnetic islands and ergodic magnetic layers in wall-lapping plasma as a non-divertor concept for a reactor-relevant Tokamak
[IPPJ-587] N82-34238

ELECTRIC CONTACTS
Thermal effects in rolling/sliding contact
[AD-A117702] N82-33719

ELECTRIC CURRENT
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-009398] N82-33842

ELECTRIC DISCHARGES
Workshop on Diffuse Discharge Opening Switches
[AD-A115883] N82-33640
Nickel-cadmium cell performance recovery and reconditioning
[SD-TR-82-63] N82-33823
Wall conditioning of the JIPP T-II Torus by ac discharge cleaning
[IPPJ-595] N82-34246
Formation of z-discharged plasma channel in LIB-fusion device
[IPPJ-601] N82-34255

ELECTRIC ENERGY STORAGE
Chemical and electrochemical behavior of the Cr(3)/Cr(2) half cell in the NASA Redox Energy Storage System
[NASA-TM-82913] N82-33463
Motor technology for electric Remotely Piloted Vehicle (RPV)
[AD-A117732] N82-33651

ELECTRIC EQUIPMENT
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859

ELECTRIC FIELDS
Multi-ion interactions and defects in metals
[AD-A117451] N82-33502
Bioelectric fields: Their sources, nature and purpose N82-33991
Importance of elastic scattering to particle direction determination in Monte Carlo calculations of DT reactions in flight
[DE82-015080] N82-34210

ELECTRIC GENERATORS
Advanced bio-energy systems for Air Force installations
[AD-A117084] N82-33835
Wind energy feasibility assessment for the US Virgin Islands, siting assessment, economic study and project plan
[DE82-009476] N82-33961

ELECTRIC MOTOR VEHICLES
Summary of electric vehicle dc motor-controller tests
[NASA-TM-82863] N82-33636
On the road performance tests of electric test vehicle for correlation with road load simulator
[NASA-TM-82900] N82-33829

ELECTRIC MOTORS
Motor technology for electric Remotely Piloted Vehicle (RPV)
[AD-A117732] N82-33651

ELECTRIC NETWORKS
Framework for power-network analysis
[DE82-012724] N82-33658

ELECTRIC POTENTIAL
The adsorption and oxidation of carbon monoxide in strong acid solutions N82-33449
Nickel-cadmium cell performance recovery and reconditioning
[SD-TR-82-63] N82-33823
Use of the Charge/Discharge (C/D) ratio to aument voltage limit (V sub T) charge control in the ERBS spacecraft
[NASA-TM-83991] N82-33824
ELECTRIC POWER PLANTS
Integrated environmental and safety assessment of selected mechanical energy storage systems
[DE82-902073] N82-33851
System study of an MHD/gas turbine combined-cycle baseload power plant
[DE82-015215] N82-33869
Assessment of a coal-gasification fuel-cell system for utility application
[DE82-903667] N82-33870
Basic techniques in availability engineering
[DE82-903666] N82-34298
ELECTRIC POWER TRANSMISSION
Framework for power-network analysis
[DE82-012724] N82-33658
ELECTRIC PROPULSION
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889-VOL-1] N82-33424
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889-VOL-2] N82-33425
ELECTRIC PULSES
Bioelectric fields: Their sources, nature and purpose N82-33991
ELECTRIC STIMULI
The effect of stimulus-central processing-response compatibility and resource competition on pilot performance
[AD-A113754] N82-34032
ELECTRIC SWITCHES
Workshop on Diffuse Discharge Opening Switches
[AD-A115883] N82-33640
ELECTRICAL ENGINEERING
USAF Summer Faculty Research Program. Volume 1: 1981 research reports
[AD-A113708] N82-34340
USAF Summer Faculty Research Program. Volume 2: 1981 research reports
[AD-A113709] N82-34341
ELECTRICAL FAULTS
Fault diagnosis of nonlinear analog circuits. Volume 1. DC diagnosis of hard failures
[AD-A117567] N82-33645
The examination of electrical-breakdown properties of insulating gases used in electrostatic accelerators
[DE82-009106] N82-33654
Framework for power-network analysis
[DE82-012724] N82-33658
ELECTRICAL GROUNDING
Improving electric grounding in frozen materials
[AD-A117873] N82-33648
ELECTRICAL INSULATION
The 1200-kV system study
[DE82-014512] N82-33659
ELECTRICAL PROPERTIES
The effects of processing conditions on the reliability of cross-linked polyethylene cable insulation
[DE82-011712] N82-33543
ELECTRICAL RESISTIVITY
Weld thermal simulator
[PB82-207283] N82-33583
Improving electric grounding in frozen materials
[AD-A117873] N82-33648
Development of a high conductivity intercalated graphite composite wire
[DE82-008973] N82-33655
ELECTROCARDIOGRAPHY
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) laboratory test results
[AD-A114073] N82-34012
ELECTROCHEMICAL CELLS
Nickel-cadmium cell performance recovery and reconditioning
[SD-TR-82-63] N82-33823
Short-circuit formation during NiCd cell reversal
[AD-A117912] N82-33836
ELECTROCHEMICAL CORROSION
Development of materials for open cycle MHD
[DE82-008777] N82-34261
ELECTROCHEMICAL OXIDATION
The adsorption and oxidation of carbon monoxide in strong acid solutions N82-33449
Chemical and electrochemical behavior of the Cr(3)/Cr(2) half cell in the NASA Redox Energy Storage System
[NASA-TM-82913] N82-33463
ELECTROCHEMISTRY
Development of nitrogen sensor for determination of PN(2) in body tissues
[AD-A116607] N82-34005
ELECTRODES
The adsorption and oxidation of carbon monoxide in strong acid solutions N82-33449
Voltammetric studies of a multipurpose membrane electrode N82-33455
The behaviour of Al electrodes in aqueous solutions
[NDRE/PUBL-81/1003] N82-33460
New viewpoints in mass filter design
[AD-A117295] N82-33468
Raman spectroscopy for in-situ monitoring of electrode processes
[DE82-014909] N82-33486
Superconductive niobium oxide tunnel device program
[AD-A117000] N82-33642
Properties of SOC12 electrolyte solutions
[AD-A117306] N82-33834
Development of nitrogen sensor for determination of PN(2) in body tissues
[AD-A116607] N82-34005
Development of materials for open cycle MHD
[DE82-008777] N82-34261
ELECTROENCEPHALOGRAPHY
An EEG predictor of performance decrement in a vigilance task
[AD-A116960] N82-34014
ELECTROLESS DEPOSITION
Thermal conductivity of electroless nickel-phosphorus alloy plating
[DE82-013529] N82-33510
ELECTROLYSIS
Molten phosphate electrolyte for the electrolysis of water
[DE82-008211] N82-33482
ELECTROLYTES
Raman spectroscopy for in-situ monitoring of electrode processes
[DE82-014909] N82-33486
Solvent extraction of nickel and copper from laterite-ammoniacal leach liquors
[PB82-176587] N82-33518
Properties of SOC12 electrolyte solutions
[AD-A117306] N82-33834
ELECTROLYTIC CELLS
Voltammetric studies of a multipurpose membrane electrode N82-33455
Calcium inorganic electrolyte battery development
[AD-A115956] N82-33831
ELECTROMAGNETIC COMPATIBILITY
Responses of FM/CW systems having filters
[AD-A117400] N82-33621
ELECTROMAGNETIC INTERFERENCE
Responses of FM/CW systems having filters
[AD-A117400] N82-33621
ELECTROMAGNETIC MEASUREMENT
Performance evaluation of RF electric and magnetic field measuring instruments
[PB82-195009] N82-33694
ELECTROMAGNETIC RADIATION
Hyperthermia heating apparatus --- cancer therapy
[NASA-CASE-NPO-14549-2] N82-33996
Transport code study of electron cyclotron heating in Tokamaks
[IPPJ-582] N82-34249
Detection of nonthermal continuum radiation in Saturn's magnetosphere
[NASA-CR-169231] N82-34326
ELECTROMAGNETIC SCATTERING
The inverse scattering problem for acoustic waves
[AD-A117048] N82-34193
ELECTROMAGNETIC SHIELDING
Arc-sprayed metals for structural electromagnetic shielding
[AD-A117673] N82-33629
ELECTROMAGNETIC SPECTRA
Research investigation directed toward extending the useful range of the electromagnetic spectrum
[AD-A117626] N82-33618
Detection of nonthermal continuum radiation in Saturn's magnetosphere
[NASA-CR-169231] N82-34326
ELECTROMAGNETIC WAVE FILTERS
New viewpoints in mass filter design
[AD-A117295] N82-33468
ELECTROMECHANICAL DEVICES
Motor technology for electric Remotely Piloted Vehicle (RPV)
[AD-A117732] N82-33651
ELECTRON BEAMS
Experimental and theoretical investigation of microwave and millimeter wave radiation from hollow, rotating, electron beams
[AD-A117896] N82-33625
Electron beam generated holographic optical element research
[AD-A117052] N82-33685
Design of the UCSB FEI electron beam system
[AD-A115937] N82-33702
Advanced joining technology
[AD-A117503] N82-33715
Effect of an electron beam on the current convective instability
[AD-A117908] N82-33937
Tables of energy-deposition distributions in water phantoms irradiated by point-monodirectional electron beams with energies from 1 to 60 MeV, and applications to broad beams
[PB82-178716] N82-34023
Short-pulse electron-beam propagation experiments in a controlled-environment chamber
[AD-A116999] N82-34212
Plasma wave turbulence and particle heating caused by electron beams, radiation and pinches
[AD-A117862] N82-34257
ELECTRON BUNCHING
A novel beam bunching concept for millimeter wave tubes
[AD-A117107] N82-33608
ELECTRON CYCLOTRON HEATING
Transport code study of electron cyclotron heating in Tokamaks
[IPPJ-582] N82-34249
ELECTRON DENSITY (CONCENTRATION)
Electron velocity shear instability in the auroral ionosphere
[AD-A116848] N82-33922
Summary of Thomson-scattering data from the Tandem Mirror Experiment (TMX)
[DE82-014956] N82-34272
ELECTRON DENSITY PROFILES
Thomson scattering on the PRETEXT Tokamak
[DE82-009085] N82-34262
Multi-point Thomson scattering
[DE82-014385] N82-34270
ELECTRON DISTRIBUTION
The impulsive phase of solar flares. 2: Characteristics of the hard X-rays
[NASA-CR-169379] N82-34328
ELECTRON EMISSION
Fracto-emission from polymers
[AD-A116786] N82-33535
ELECTRON ENERGY
Thomson scattering on the PRETEXT Tokamak
[DE82-009085] N82-34262
Multi-point Thomson scattering
[DE82-014385] N82-34270
Summary of Thomson-scattering data from the Tandem Mirror Experiment (TMX)
[DE82-014956] N82-34272
ELECTRON IRRADIATION
Tables of energy-deposition distributions in water phantoms irradiated by point-monodirectional electron beams with energies from 1 to 60 MeV, and applications to broad beams
[PB82-178716] N82-34023
ELECTRON MICROSCOPY
KQ measurements with rheometrics mechanical spectrometer
[AD-A117903] N82-33781
ELECTRON PROBES
Multi-point Thomson scattering
[DE82-014385] N82-34270
Calibration of a diamagnetic diagnostic for stored energy of high-temperature electron annuli in Elmo Bumpy Torus (EBT)
[DE82-015235] N82-34271
ELECTRON TRAJECTORIES
Electron drift in a linear magnetic wiggler with an axial guide field
[AD-A115739] N82-33700
The effects of transverse gradient of static magnetic wigglers on the free electron laser
[AD-A116968] N82-33704
ELECTRON TRANSFER
Anomalous reorganization free energies in optical electron transfer in solution
[AD-A117680] N82-34202
ELECTRONIC AIRCRAFT
Reliability, Availability, Maintainability Data Tracking Plan improved GUARDRAIL 5
[AD-A117933] N82-33378
ELECTRONIC EQUIPMENT
Electronic tester study
[DE82-016028] N82-33657

ELECTRONIC EQUIPMENT TESTS
Fault diagnosis of nonlinear analog circuits. Volume 1. DC diagnosis of hard failures
[AD-A117567] N82-33645
ELECTRONIC PACKAGING
Glass-to-metal seal quality
[AD-A117598] N82-33718
ELECTROSTATIC PROBES
An atlas of ionospheric F-region structures as determined by the NRL-747/S3-4 ionospheric irregularities satellite investigation
[AD-A117269] N82-33923
ELECTROSTATIC WAVES
Propagation characteristics in a magnetized plasma-waveguide near the ion cyclotron frequency
[IPPJ-598] N82-34253
ELECTROSTATICS
Effect of magnetic shear on the electrostatic ion cyclotron waves in magnetospheric plasmas
[NASA-CR-169229] N82-34183
ELEVATION
Applying photogrammetry to real time collection of digital image data
[AD-A116770] N82-33687
The roughness lengths associated with regions of heterogeneous vegetation and elevation
[AD-A117409] N82-33802
ELLIPTIC DIFFERENTIAL EQUATIONS
Elliptic equation solvers for NORDA ocean models and a study of equatorial ocean dynamics
[AD-A117374] N82-33977
EMBEDDED COMPUTER SYSTEMS
Weapon system software acquisition and support: A theory of system structure and behavior
[AD-A115555] N82-34103
EMBEDDING
An approach to describing the functional requirements of an embedded communication system
[AD-A115738] N82-33598
EMBRITTLEMENT
Effects of residual impurities on hydrogen assisted cracking in high strength steels
[AD-A116966] N82-33497
Effects of residual impurities on hydrogen assisted cracking in high strength steels, part 1
[AD-A116948] N82-33498
EMERGENCIES
Reflections on an F-43 in flight emergency
[AD-A116873] N82-33358
EMISSION
Predictive model for jet engine test cell opacity
[AD-A117585] N82-33397
EMISSION SPECTRA
Output tube emission characteristics of operational radars
[PB82-193426] N82-33633
Einstein Observatory solid state spectrometer observations of M87 and the Virgo cluster
[NASA-TM-83946] N82-34314
Detection of nonthermal continuum radiation in Saturn's magnetosphere
[NASA-CR-169231] N82-34326
EMISSIVITY
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic paricles
[NASA-CR-169416] N82-34197
EMULSIONS
The problem of ensuring a specified molecular weight in the process of emulsion polymerization
[NRC/CNR-TT-2026] N82-33529
Research on fire-resistant diesel fuel
[AD-A117408] N82-33550
Optical Studies of model binary miscibility gap system
[NASA-TM-82494] N82-33683
Technique for the aerobic cultivation of microorganisms in water-in-oil emulsions
[NRC/CNR-TT-2031] N82-33980
ENERGY ABSORPTION
Results from tests of three prototype general aviation seats
[NASA-TM-84533] N82-33733
Crashworthy airframe design concepts: Fabrication and testing
[NASA-CR-3603] N82-33735
Tables of energy-deposition distributions in water phantoms irradiated by point-monodirectional electron beams with energies from 1 to 60 MeV, and applications to broad beams
[PB82-178716] N82-34023
ENERGY CONSERVATION
The CF6 jet engine performance improvement: Low pressure turbine active clearance control
[NASA-CR-165557] N82-33393
Residential heating and cooling loads and costs for the South
[DE82-009504] N82-33853
Home retrofitting for energy conservation and solar considerations
[DE82-013420] N82-33860
Identification of energy conservation research opportunities: A review and synthesis of the literature
[DE82-015028] N82-33875
Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs and improve readiness
[AD-A117935] N82-34296
ENERGY CONSUMPTION
Development of an energy test method for a dedicated water-heating pump
[PB82-170069] N82-33575
NECAP 4.1: NASA's Energy Cost Analysis Program engineering manual
[NASA-TM-83240] N82-33825
NECAP 4.1: NASA's Energy Cost Analysis Program engineering flow chart
[NASA-TM-83242] N82-33826
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865
Electrical energy consumption and heating requirements of municipal wastewater treatment plants
[PB82-183393] N82-33882
ENERGY CONVERSION
Advanced bio-energy systems for Air Force installations
[AD-A117084] N82-33835
ENERGY CONVERSION EFFICIENCY
Electrical energy consumption and heating requirements of municipal wastewater treatment plants
[PB82-183393] N82-33882
ENERGY DISSIPATION
Importance of elastic scattering to particle direction determination in Monte Carlo calculations of DT reactions in flight
[DE82-015080] N82-34210
Self-consistent analysis of collisional loss in a spatially varying magnetic mirror
[IPPJ-588] N82-34245
ENERGY POLICY
Assessment of underground coal gasification in bituminous coals. Volume 1: Executive summary
[DE82-014584] N82-33557
Residual energy application program: Utilization of high-temperature waste heat by means of Rankine-cycle engines. A technical summary
[DE82-010376] N82-33839
Residential solar data center: Data resources and reports
[PB82-180845] N82-33883
Energy laboratory data and model directory
[PB82-180274] N82-33884
ENERGY SOURCES
Preliminary study of in-situ combustion in diatomites
[DE82-013272] N82-33862
The application of US upper-wind data in one design of tethered wind energy systems
[DE82-012860] N82-33962
ENERGY STORAGE
Development of a long-life high-temperature catalyst for the SO2/SO3 energy-storage system
[DE82-009723] N82-33840
Superconducting Magnetic Energy Storage (SMES) Program
[DE82-009083] N82-33848
Integrated environmental and safety assessment of selected mechanical energy storage systems
[DE82-902073] N82-33851
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory
[DE82-010867] N82-33866
Geotechnical issues and guidelines for storage of compressed air in excavated hard rock caverns
[DE82-015027] N82-33872
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary
[DE82-008345] N82-33877
ENERGY TECHNOLOGY
Advanced bio-energy systems for Air Force installations
[AD-A117084] N82-33835
Technology assessment of solar-energy systems. Part 1: An analysis of life-cycle costs of solar facilities. Part 2: Minerals critical to the development of future energy technologies in high and low solar scenarios
[DE82-012339] N82-33852
Home retrofitting for energy conservation and solar considerations
[DE82-013420] N82-33860
Assessment of energy saving technologies with potential for applications in US industries
[DE82-012571] N82-33874
Energy laboratory data and model directory
[PB82-180274] N82-33884
The Montana Energy and MHD Development Institute, Inc.
[PB82-176926] N82-33885
Ocean thermal energy conversion, fiscal year 1981. Public Law 96-320 N82-33888
ENERGY TRANSFER
Tables of energy-deposition distributions in water phantoms irradiated by point-monodirectional electron beams with energies from 1 to 60 MeV, and applications to broad beams
[PB82-178716] N82-34023
ENGINE DESIGN
Engine dynamic analysis with general nonlinear finite element codes. Part 2: Bearing element implementation overall numerical characteristics and benchmaking
[NASA-CR-167944] N82-33390
Structural tailoring of engine blades (STAEBL)
[NASA-CR-167949] N82-33391
ENGINE INLETS
Energy efficient engine: Turbine transition duct model technology report
[NASA-CR-167996] N82-33394
ENGINE NOISE
The effects of multiplicative motor noise on the optimal human operator model N82-34042
Noise measurement in wind tunnels, workshop summary
[NASA-TM-84219] N82-34188
ENGINE PARTS
Long-term materials test program: Materials exposure test plan
[DE82-013322] N82-33516
Automotive Stirling Engine Mod 1 Design Review, volume 1
[NASA-CR-167935] N82-34311
Automotive Stirling Engine Mod 1 Design Review, volume 3 --- engineering drawings
[NASA-CR-167397] N82-34312
ENTRAINMENT
Coal gasification reactions with on-line in-situ FTIR analysis
[DE82-005658] N82-33485
ENVIRONMENT EFFECTS
Integrated environmental and safety assessment of selected mechanical energy storage systems
[DE82-902073] N82-33851
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary
[DE82-008345] N82-33877
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes
[DE82-903730] N82-33898
Potential health and environmental effects of the fluidized-bed combustion of coal
[DE82-014389] N82-33900
Potential health and environmental effects of light-duty diesel vehicles, 2
[DE82-014390] N82-33901
Symposium on Environmental Technology and Management
[PB82-185273] N82-33902
Environmental aspects of potential petroleum exploration and exploitation in Antarctica: Forecasting and evaluating risks
[PB82-169772] N82-33907
USSR Report: Life sciences. Biomedical and behavioral sciences
[JPRS-81775] N82-33988
ENVIRONMENT POLLUTION
Part 1: Ancient arctic ice does not contain large excesses of natural lead. Part 2: Chronological variations in lead and barium concentrations and lead isotopic compositions in sediments of four southern California off-shore basins N82-33791
Formaldehyde and other aldehydes
[PB82-180498] N82-33909
ENVIRONMENT PROTECTION
Air quality trends in Region 8, 1980 data
[PB82-204074] N82-33910
ENVIRONMENTAL LABORATORIES
Experimental analysis of team performance: Methodological developments and research results
[AD-A116915] N82-34034
ENVIRONMENTAL TESTS
Guidelines for the determination of atmospheric conditions of oil mists
[PB82-174251] N82-33908
Environmental data for sites in the national solar data network
[DE82-008076] N82-33959
ENVIRONMENTS
A summary of the results of a study of acoustic bottom interaction in a range dependent environment
[AD-A116891] N82-33970

EPOXY COMPOUNDS
Development of effective machining and tooling techniques for Kevlar composite laminates
[AD-A117853] N82-33716
EPOXY MATRIX COMPOSITES
Composite structural materials
[NASA-CR-169345] N82-33434
Mechanical properties of E293/1581 fiberglass-epoxy composite and several adhesive systems
[AD-A117902] N82-33442
EPOXY RESINS
Ultraviolet-radiation-curable paints
[DE82-015717] N82-33545
KQ measurements with rheometrics mechanical spectrometer
[AD-A117903] N82-33781
EQUALIZERS (CIRCUITS)
Decision-Feedback Equalizer Simulation (DFES): Description of variables
[AD-A117898] N82-33626
EQUATIONS OF MOTION
Analysis of a kite anemometer
[DE82-009058] N82-33691
A mixed formulation finite element for linear thin shell analysis N82-33753
Approximate theory for the transverse motion of a two-layered plate. A theoretical model applicable to acoustic scattering from submerged structures with coating layer(s)
[AD-A117034] N82-33767
Perturbation of homoclinics and subharmonics in Duffing's equation
[AD-A117390] N82-34152
Utilization of quantum distribution functions for ultra submicron device transport
[AD-A117433] N82-34280
Equatorial motion about an oblate primary
[AD-A117641] N82-34324
EQUATORIAL ORBITS
Equatorial motion about an oblate primary
[AD-A117641] N82-34324
EQUATORIAL REGIONS
Observations of vertically propagating equatorially-trapped waves in the deep western Indian Ocean
[NASA-CR-169375] N82-33974
ERGODIC PROCESS
Formation of magnetic islands and ergodic magnetic layers in wall-lapping plasma as a non-divertor concept for a reactor-relevant Tokamak
[IPPJ-587] N82-34238
EROSION
A study of the nature of solid particle impact and shape on the erosion morphology of ductile metals
[NASA-TM-82933] N82-33493
Long-term materials test program: Materials exposure test plan
[DE82-013322] N82-33516
ERROR ANALYSIS
Applicability of factor analysis to the determination of mineral matter in coal N82-33790
Cartographic mapping study
[NASA-CR-170446] N82-33795
Analysis of space telescope data collection system
[NASA-CR-162090] N82-34322
ERROR DETECTION CODES
XERROR: The SLATEC error-handling package
[DE82-015494] N82-34116
ERROR FUNCTIONS
System identification: A question of uniqueness, revisited N82-33763
ERRORS
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-169419] N82-33422
in-situ measurement of particulate in turbulent duct flows
[DE82-010291] N82-33671
ESCAPE SYSTEMS
Investigation of aircrew protection during emergency escape at dynamic pressures up to 1600 Q
[AD-A117552] N82-33359
ESCARPMENTS
The marine geology of the Bahama Escarpment N82-33916
ESTIMATES
Objective specification of Atlantic Ocean wind fields from historical data
[AD-A117683] N82-33958
ESTIMATING
Effect of counting and tracking on verbal and production methods of time estimation N82-34049
The G-spectral estimator
[AD-A116942] N82-34144
Robust regression procedures for predictor variable outliers
[AD-A117022] N82-34167
ETHYL ALCOHOL
Structures and fragmentation mechanics of the ions of ethanol by triple quadrupole mass spectrometry
[AD-A117442] N82-34200
EULER EQUATIONS OF MOTION
Euler solutions of supersonic wing-body interference at high incidence including vortex effects
[NEAR-TR-263] N82-33341
Simulation of the fluctuating field of a forced jet
[NASA-TM-84506] N82-34191
EVALUATION
A safety appraisal of the air traffic control system
[AD-A115743] N82-33366
HRTES Human Resources Test and Evaluation System. Volume 1: Test procedures
[AD-A115594] N82-34029
HRTES Human Resources Test and Evaluation System. Volume 2: Supplement
[AD-A115595] N82-34030
A model-based technique for predicting pilot opinion ratings for large commercial transports N82-34050
An evaluation of the relative performance of three infrared imagers through fog
[AD-A116893] N82-34222
EVAPORATION
Evaporation in Relation to Hydrology
[PB82-176108] N82-33814
Inelastic interactions of 4.5 GeV/c protons with emulsion nuclei not accompanied by relativistic charged particles
[DE82-701020] N82-34207
EVAPORATORS
An assessment of heat-transfer correlations for turbulent water flow through a pipe at Prandtl numbers of 6.0 and 11.6
[DE82-014426] N82-33677
EVOLUTION (DEVELOPMENT)
Geology and evolution of the magmatic rocks of the Vourinos Ophiolite, northern Greece N82-33914
Geologic evolution of the Cordillera Darwin orogenic core complex, Southern Andes N82-33917
EXERCISE PHYSIOLOGY
Mechanisms of change in plasma volume to acute and chronic exercise in man N82-33999
Prolonged self-paced hard physical exercise comparing trained and untrained men
[AD-A116608] N82-34006
Effects of prior physical exertion on tolerance to hypoxia, orthostatic stress, and physical fatigue
[AD-A114741] N82-34009
Acute albumin-induced plasma volume expansion and exercise in the heat: Effects on hormonal responses in men
[AD-A115180] N82-34017
EXHAUST EMISSION
Exhaust emissions reduction for intermittent combustion aircraft engines
[NASA-CR-167914] N82-33392
Potential health and environmental effects of light-duty diesel vehicles, 2
[DE82-014390] N82-33901
EXHAUST GASES
Predictive model for jet engine test cell opacity
[AD-A117585] N82-33397
Residual energy application program: Utilization of high-temperature waste heat by means of Rankine-cycle engines. A technical summary
[DE82-010376] N82-33839
EXOBIOLOGY
Aerospace medicine and biology. A continuing bibliography with indexes, supplement 235, August 1982
[NASA-SP-7011(235)] N82-33995
EXPANSION
Edgeworth expansions in statistics: A brief review
[AD-A117061] N82-34165
EXPERIMENTAL DESIGN
China's newly designed and built aircraft engine test stand
[AD-A117569] N82-33410
Spacelab mission 2: Experimental descriptions
[NASA-TM-82477] N82-33411
The CRITTER system: Analyzing digital circuits by propagating behavior and specifications
[AD-A117887] N82-33650
An apparatus for the measurement of pulmonary function in unanesthetized small animals
[AD-A114938] N82-33985
Application of control theory to dynamic systems simulation
[NASA-CR-166383] N82-34077
Interruptible supersaturated two-level designs
[AD-A115786] N82-34181
EXPLOSIVES
Synthesis and characterization of new insensitive high energy polynitramine compound, 2,4,8,10-tetranitro-2,4,8,10-tetraazaspiro (5.5) undecane (TNSU)
[AD-A116832] N82-33533
Explosive-powder compaction system
[DE82-003134] N82-33556
EXPOSURE
Durability of post-tensioned concrete beams exposed to severe natural weathering
[AD-A13130] N82-33769
Variations in noise dosimeter readings of fluctuating noise
[AD-A115763] N82-34002
EXTRAGALACTIC RADIO SOURCES
Shuttle VLBI experiment. Technical working group summary report
[NASA-TM-82491] N82-34315
EXTRATERRESTRIAL RADIATION
Theoretical studies of radiation effects in composite materials for space use — graphite-epoxy composites
[NASA-CR-3618] N82-34335

F

F REGION
An atlas of ionospheric F-region structures as determined by the NRL-747/S3-4 ionospheric irregularities satellite investigation
[AD-A117269] N82-33923
Lunar variation of several ionospheric parameters
[AD-A117689] N82-33938
F-4 AIRCRAFT
Reflections on an F-43 in flight emergency
[AD-A116873] N82-33358
F-14 AIRCRAFT
Survey and update of F-14A mission profiles for TF30 engine usage
[AD-A116831] N82-33337
F-16 AIRCRAFT
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle N82-34062
F-18 AIRCRAFT
Rolling flow wind tunnel tests of F-18 aircraft
[NASA-CR-169344] N82-33338
Curved flow wind tunnnel test of F-18 aircraft
[NASA-CR-169345] N82-33339
FABRICATION
Application of In Situ Fiberization for fabrication of improved strain isolation pads and graphite epoxy composites
[NASA-CR-3616] N82-33431
FABRICS
Seamless collapsible fuel tanks, phase 1
[AD-A116765] N82-33714
FACSIMILE COMMUNICATION
Graphic/symbol segmentation for Group 4 facsimile systems
[AD-A117026] N82-33684
FACTOR ANALYSIS
Applicability of factor analysis to the determination of mineral matter in coal N82-33790
FACTORIZATION
Recent applications of the transonic wing analysis computer code, TWING
[NASA-TM-84283] N82-33346
FAILURE
Stochastic availability of a repairable system with an age and maintenance dependent failure rate
[AD-A116932] N82-34294
FAILURE ANALYSIS
Age dependent minimal repair
[AD-A116846] N82-33336
Study of an automatic trajectory following control system
[NASA-CR-169361] N82-33399
Fracture mechanics of delamination: Initiation and growth
[AD-A115726] N82-33438
Hygrothermal effects on the micromechanisms of crack extension in glass fibre and carbon fibre composites
[PB82-176728] N82-33447
Fault diagnosis of nonlinear analog circuits. Volume 1. DC diagnosis of hard failures
[AD-A117567] N82-33645
Bayes adaptive estimation of the point of shift to the wear-out phase of reliability systems
[AD-A117865] N82-33725
FAILURE MODES
Accelerated fatigue durability of a high performance composite
[NASA-CR-166407] N82-33437

FAN BLADES
Structural tailoring of engine blades (STAEBL)
[NASA-CR-167949] N82-33391
Lift system and fan performance of air cushion supported vehicles
[AD-A117363] N82-33570
FAR ULTRAVIOLET RADIATION
Triply differential studies of atomic and molecular photoionization using synchrotron radiation
[AD-A117247] N82-34198
FARADAY EFFECT
Inter-subband optical absorption in an inverse layer on a semiconductor surface in tilted magnetic fields
[DE82-011591] N82-34185
FAST FOURIER TRANSFORMATIONS
Turbulence analysis by use of the fast Fourier transform --- for calculation of impact on missile systems
[AD-A117157] N82-33953
FASTENERS
Mechanical fastener
[NASA-CASE-LAR-12738-1] N82-33419
FATIGUE (MATERIALS)
Accelerated fatigue durability of a high performance composite
[NASA-CR-166407] N82-33437
Fatigue of laminated composite structures
[AD-A117731] N82-33443
Damage accumulation during fatigue of composites
[PB82-182312] N82-33445
Screening tests of conformally-coated printed wiring boards
[DE82-012873] N82-33656
Nondestructive method for determining fatigue and stress-corrosion damage
[AD-A117631] N82-33774
Finite-element analysis of some full- and partial-ring crack-propagation test specimens
[AD-A117674] N82-33783
Investigations on the improvement of corrosion resistance and strength of ribbed reinforcing steel bars in concrete, especially when subject to fatigue loading
[PB82-204330] N82-33787
FATIGUE LIFE
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N82-33436
Damage accumulation during fatigue of composites
[PB82-182312] N82-33445
Fatigue behaviour of advanced structural aluminium alloy 74575-T761 --- for aircraft construction
[TAE-447] N82-33492
FATIGUE TESTS
Stress corrosion characterization of turbine rotor materials, phase 1
[DE82-902070] N82-33508
FEASIBILITY ANALYSIS
Feasibility study: Hollow plastic spheres to increase hydraulic fluid compressibility
[NASA-CR-169374] N82-33539
Conversion of waste plastics to fuel oil
[DE82-002454] N82-33873
Development of nitrogen sensor for determination of PN(2) in body tissues
[AD-A116607] N82-34005
Biodynamic data bank feasibility study
[AD-A117921] N82-34020
FEDERAL BUDGETS
Analysis of NASA's fiscal year 1983 budget request for research and development to determine the amount that supports DOD's programs
[B-207165] N82-34307
Making appropriations for the National Aeronautics and Space Administration
[H-REPT-97-897] N82-34308
The Department of Defense statement on the science and technology program by Mr. H. Mark Grove, Assistant Deputy Under Secretary of Defense for Research and Advanced Technology before the Defense Subcommittee of the Committee on Appropriations of the United States House of Representatives, 97th Congress, second session
[AD-A116788] N82-34339
FEEDBACK CONTROL
Weld thermal simulator
[PB82-207283] N82-33583
Servo systems of combined control
[AD-A115994] N82-33639
Constrained multibody system dynamics: An automated approach N82-33762
FEEDFORWARD CONTROL
Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-34060
FERMENTATION
Aeration-agitation control based on a mathematical model of the fermentation process
[NRC/CNR-TT-2029] N82-33461
FERMIONS
Mean field theory for lattice gauge systems with fermions
[DE82-700785] N82-34289
FERRITES
Waveguide Y-circulator
[AD-A112086] N82-33637
Magnetic properties of lithium ferrite microwave materials
[AD-A116907] N82-34184
FERROMAGNETIC MATERIALS
An analytical investigation of fin lines with magnetized ferrite substrate
[AD-A117504] N82-33624
Central limit theorems in the area of large deviations for some dependent random variables
[AD-A117714] N82-34155
Helical magnetic configurations produced with the help of ferromagnetic materials. 2: The Helimag
[IPPJ-591] N82-34243
FERTILIZERS
Biomass production, anaerobic digestion, and nutrient recycling of small benthic or floating seaweeds
[DE82-009172] N82-33843
FIBER COMPOSITES
Correlations for the fracture of composite materials
[PB82-181421] N82-33446
FIBER OPTICS
Electron beam generated holographic optical element research
[AD-A117052] N82-33685
Fluoropolymer barriers to stress corrosion in optical fibers
[AD-A117346] N82-34224
Optical rotary joint
[AD-A117025] N82-34226
Development and test of a digital/optical linear position transducer
[AD-A117918] N82-34231
FIBER REINFORCED COMPOSITES
Application of In Situ Fiberization for fabrication of improved strain isolation pads and graphite epoxy composites
[NASA-CR-3616] N82-33431
Composite structural materials
[NASA-CR-169345] N82-33434
Thermal fatigue behavior of FP alumina/magnesium composites
[AD-A117292] N82-33440
Cracking and toughness of concrete and polymer-concrete dispersed with short steel wires
[PB82-180589] N82-33578
Design methodology for bonded-bolted composite joints. Volume 1: Analysis derivations and illustrative solutions
[AD-A117342] N82-33713
Mechanics of bimodular composite structures
[AD-A117942] N82-33776
FIBER RELEASE
Hygrothermal effects on the micromechanisms of crack extension in glass fibre and carbon fibre composites
[PB82-176728] N82-33447
FIBER STRENGTH
Strength diagrams of fibrous composites with unidirectional structure
[NASA-TM-76975] N82-33433
Reinforced concrete modeling
[AD-A117925] N82-33775
FIBERS
Strength diagrams of fibrous composites with unidirectional structure
[NASA-TM-76975] N82-33433
FIELD EFFECT TRANSISTORS
Equilibrium noise in ion selective field effect transistors
[AD-A117525] N82-33652
FIELD THEORY (PHYSICS)
Simulation of the fluctuating field of a forced jet
[NASA-TM-84506] N82-34191
Structure of field rotating disturbances in warm plasma
[NASA-CR-169359] N82-34256
Charge penetration effects in rare-earth crystal fields
[AD-A117494] N82-34283
Mean field theory for lattice gauge systems with fermions
[DE82-700785] N82-34289
FIGHTER AIRCRAFT
The AIDS/F-18 diffractive HUD
[AD-A116026] N82-33382
Fatigue behaviour of advanced structural aluminium alloy 74575-T761 --- for aircraft construction
[TAE-447] N82-33492
Structures of memory for critical flight information
[AD-A116510] N82-34028
FIGURE OF MERIT
Figures of merit: Use and interpretation in evaluating program alternatives
[AD-A117233] N82-34295
FILLETS
GMA welding experiments using real-time control
[PB82-204652] N82-33722
FILMS
Thermal effects in rolling/sliding contact
[AD-A117702] N82-33719
FINANCIAL MANAGEMENT
MISIL, too big to fly
[AD-A117940] N82-34303
NASA authorization and NOAA LANDSAT authorization for 1983, volume 2
[GPO-93-418] N82-34306
FINE STRUCTURE
Spherical agglomeration of flocculated precipitate
[NRC/CNR-TT-2024] N82-33462
FINES
Monitoring of submicrometer particles in sealed fire areas
[PB82-175951] N82-33810
FINITE DIFFERENCE THEORY
Finite difference modeling of rotor flows including wake effects
[NASA-TM-84280] N82-33345
Computation of two-dimensional time-dependent natural convection of compressible fluid in a rectangular enclosure
[PB82-198797] N82-33679
IFD: An implicit finite-difference computer model for solving the parabolic equation
[AD-A117701] N82-34156
Finite difference approximations and stability of distributed parameter systems
[PB82-177635] N82-34158
FINITE ELEMENT METHOD
Implementation of a C-1 triangular element based on the P-version of the finite element method N82-33749
Integration of multidimensional regions with applications to finite element analysis N82-33750
An emulator for minimizing finite element analysis implementation resources N82-33751
the finite element machine: An experiment in parallel processing N82-33752
A mixed formulation finite element for linear thin shell analysis N82-33753
An exact zooming method for finite element analyses N82-33754
A finite element approach for shells of revolution with a local deviation N82-33756
Synthesis of frameworks under multilevel performance constraints N82-33757
Solution of Von Karman's plate equation with perturbation and series summation N82-33761
Reinforced concrete modeling
[AD-A117925] N82-33775
The analysis of elastic-plastic deformation and stress at finite strain and their evaluation
[AD-A117505] N82-33779
Three-dimensional finite-element analysis of layered composite structures
[AD-A117492] N82-33780
Finite-element analysis of some full- and partial-ring crack-propagation test specimens
[AD-A117674] N82-33783
A version of the graphics-oriented interactive finite element time-sharing system (GIFTS) for an IBM with CP/CMS
[AD-A116798] N82-34092
Moving finite elements in 2-D
[AD-A117078] N82-34142
FINNED BODIES
An inviscid computational method for tactical missile configurations
[AD-A116904] N82-33415
FIRE PREVENTION
Explosives instrumentation group trial 6/77-propellant fire trials (series 2)
[AD-A117695] N82-33555
FIRES
Examination of aircraft interior emergency lighting in a postcrash fire environment
[AD-A117629] N82-33360
Dayton aircraft cabin fire model, version 3. Volume 1: Physical description
[AD-A117905] N82-33361
Explosives instrumentation group trial 6/77-propellant fire trials (series 2)
[AD-A117695] N82-33555
Monitoring of submicrometer particles in sealed fire areas
[PB82-175951] N82-33810

FLAME SPECTROSCOPY
Investigations into a more general solution to the problem of matrix interferences in combined atomizer atomic absorption spectrometry N82-33454
FLASH POINT
Research on fire-resistant diesel fuel
[AD-A117408] N82-33550
FLAT PLATES
Nonlinear analysis of rectangular glass plates by finite difference methods
[PB82-172552] N82-33547
Advances and trends in plate buckling research N82-33760
Solar-heated municipal swimming pools, a case study: Dade County, Florida
[DE82-009475] N82-33844
FLEXIBLE BODIES
Seamless collapsible fuel tanks, phase 1
[AD-A116765] N82-33714
FLEXIBLE SPACECRAFT
The dynamics and control of large flexible space structures-V
[NASA-CR-169360] N82-33423
FLIGHT CHARACTERISTICS
A ground-simulator investigation of helicopter longitudinal flying qualities for instrument approach
[NASA-TM-84225] N82-33398
Pilot opinions of sampling effects in lateral-directional control N82-34053
FLIGHT CLOTHING
Blue Flight Coverall Program
[AD-A116856] N82-34082
FLIGHT CONTROL
Voice Interactive Systems Technology Avionics (VISTA) Program
[AD-A117288] N82-33383
Combined discrete network. Continuous control modelling of operator behavior N82-34064
PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066
FLIGHT CREWS
PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066
A computer aided workstation assesor for crew operations - WOSTAS
[AD-A116045] N82-34079
FLIGHT FATIGUE
Effects of prior physical exertion on tolerance to hypoxia, orthostatic stress, and physical fatigue
[AD-A114741] N82-34009
FLIGHT INSTRUMENTS
Non-complex item development specification for a feasibility model of an electronic master monitor and advisory display system (EMMADS)
[AD-A117919] N82-33386
Aircraft alerting systems standardization study. Phase 4: Accident implications on systems design
[AD-A117876] N82-33388
FLIGHT PATHS
Northeast corridor helicopter area navigation accuracy evaluation
[AD-A117445] N82-33367
FLIGHT SAFETY
Examination of the Federal Aviation Administration's plan for the National Airspace System
[AFMD-82-66] N82-33403
FLIGHT SIMULATION
Development of methods for assessment of gliding parachute applications
[AD-A117103] N82-33356
Terrain following/terrain avoidance system concept development N82-33363
Optical flow and texture variables useful in simulating self motion
[AD-A117016] N82-34081
FLIGHT SIMULATORS
A ground-simulator investigation of helicopter longitudinal flying qualities for instrument approach
[NASA-TM-84225] N82-33398
Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system
[AD-A117141] N82-33407
Assessment and development of oculomotor flying skills by the application of the channel theory of vision
[AD-A115325] N82-34035
FLIGHT TESTS
Flight tests of a GE and DCI direct drive fly by wire flight control system
[AD-A117244] N82-33401
FLIGHT TRAINING
Airsickness during Naval flight officer training: Advanced Squadron VT86-RIO (new syllabus)
[AD-A114685] N82-34011
Structures of memory for critical flight information
[AD-A116510] N82-34028
FLIR DETECTORS
Alternative employment concepts for Remotely Piloted Vehicle (RPV) FLIR/TV mission payload
[AD-A117877] N82-33379
Preliminary assessment of US Coast Guard Short Range Recovery (SRR) Forward Looking Infrared (FLIR) system small target detection performance
[AD-A117916] N82-34230
FLOCCULATING
Spherical agglomeration of flocculated precipitate
[NRC/CNR-TT-2024] N82-33462
FLOORS
Crashworthy airframe design concepts: Fabrication and testing
[NASA-CR-3603] N82-33735
FLORIDA
Coastal construction practices
[PB82-201062] N82-33591
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813
FLOW CHARACTERISTICS
Flow phenomena in compressor casing treatment
[CUED/A-TURBO/TR-112] N82-33661
FLOW CHARTS
NECAP 4.1: NASA's Energy Cost Analysis Program engineering flow chart
[NASA-TM-83242] N82-33826
FLOW DISTORTION
Supersonic jet noise generated by large scale instabilities
[NASA-TP-2072] N82-34189
FLOW DISTRIBUTION
The analysis for regulation performance of a variable thrust rocket engine control system
[AD-A117495] N82-33429
Simulation of the fluctuating field of a forced jet
[NASA-TM-84506] N82-34191
FLOW GEOMETRY
Curved flow wind tunnnel test of F-18 aircraft
[NASA-CR-169345] N82-33339
FLOW MEASUREMENT
Acta Mechanica Sinica (selected articles)
[AD-A115634] N82-33665
FLOW RESISTANCE
Existence of a global weak solution to the nonlinear waterhammer program
[DE82-010717] N82-33678
FLOW STABILITY
James Clerk Maxwell's Cambridge manuscripts: Extracts relating to control and stability, part 1
[PB82-180571] N82-34160
Supersonic jet noise generated by large scale instabilities
[NASA-TP-2072] N82-34189
FLOW VELOCITY
China's newly designed and built aircraft engine test stand
[AD-A117569] N82-33410
Finite element modeling of nonisothermal polymer flows
[NASA-CR-169355] N82-33525
Interaction of oscillations of channel flow and flow separation at duct discontinuities
[AD-A116801] N82-33666
Mechanisms affecting mass transfer in fuel cells
[DE82-013431] N82-33876
FLOW VISUALIZATION
Wind-tunnel drag measurements of a ball-obturated tubular projectile
[AD-A117268] N82-33351
AFOSR Research Meeting on Diagnostics of Reacting Flow
[AD-A117075] N82-33668
FLUE GASES
Preliminary economic analysis of NO sub x flue-gas treatment processes using TVA and EPRI economic premises
[DE82-902223] N82-33895
FLUID DYNAMICS
The fluid mechanics of non-nucleating wet steam flows
[CUED/A-TURBO/TR-111] N82-33662
Elliptic equation solvers for NORDA ocean models and a study of equatorial ocean dynamics
[AD-A117374] N82-33977
FLUID FILTERS
New viewpoints in mass filter design
[AD-A117295] N82-33468
FLUID FLOW
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672
Flow characteristics in geopressured zones and salt water agulfers
[PB82-181280] N82-33807
FLUID MECHANICS
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium
[DE82-009289] N82-33673
FLUIDIZED BED PROCESSORS
Technical evaluation: Pressurized fluidized-bed combustion technology
[DE82-014903] N82-33487
Glass batch preheater: Phase 2. Laboratory testing
[PB82-180639] N82-33577
Influence of sulfation-enhanced salt additives on the corrosion behavior of materials in atmospheric fluidized-bed combustors
[DE82-010204] N82-33670
Potential health and environmental effects of the fluidized-bed combustion of coal
[DE82-014389] N82-33900
FLUORESCENCE
Micom program in light control by light
[AD-A117159] N82-33706
FLUOROCARBONS
Application of In Situ Fiberization for fabrication of improved strain isolation pads and graphite epoxy composites
[NASA-CR-3616] N82-33431
FLUOROHYDROCARBONS
Raman studies of reorientational and vibrational relaxation in dense fluids N82-33456
FLUOROPOLYMERS
Surface texturing of fluoropolymers
[NASA-CASE-LEW-13026-1] N82-33521
Fluoropolymer barriers to stress corrosion in optical fibers
[AD-A117346] N82-34224
FLUTTER ANALYSIS
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[NASA-TM-83276] N82-33736
FLUX (RATE)
Probe measurements for impurity transport in the scrape-off layer of JIPP T-II
[IPPJ-590] N82-34239
FLY ASH
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes
[DE82-903730] N82-33898
FLY BY WIRE CONTROL
Flight tests of a GE and DCI direct drive fly by wire flight control system
[AD-A117244] N82-33401
FLYING PERSONNEL
Structures of memory for critical flight information
[AD-A116510] N82-34028
FLYWHEELS
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-014875] N82-33444
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory
[DE82-010867] N82-33866
FOAMS
An evaluation of 3 wet dust control techniques for face drills
[PB82-177320] N82-33808
Evaluation of the use of foam for dust control on face drills and crushers
[PB82-176215] N82-33809
FOG
Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary
[AD-A116794] N82-33925
Cold weather goggles. Part 3: Resistance to fogging
[AD-A115898] N82-34078
An evaluation of the relative performance of three infrared imagers through fog
[AD-A116893] N82-34222
FOKKER-PLANCK EQUATION
Self-consistent analysis of collisional loss in a spatially varying magnetic mirror
[IPPJ-588] N82-34245
FOLDS (GEOLOGY)
Structural geometry of the Snake River Range, Idaho and Wyoming N82-33912
FORCE DISTRIBUTION
An exact zooming method for finite element analyses N82-33754
FORECASTING
Seismic waves N82-33563
Prospective significance of temperate-zone carbon pool transients, 1980 - 2010
[DE82-011866] N82-33896
A survey of ionospheric models: A preliminary report on the development of an ionospheric model thesaurus and users guide
[AD-A117659] N82-33935

A model of subjective probabilities from small groups N82-34054
FOREIGN TRADE
United Kingdom mineral statistics 1980 [PB82-172362] N82-33817
FOREST MANAGEMENT
Prospective significance of temperate-zone carbon pool transients, 1980 - 2010 [DE82-011866] N82-33896
FORESTS
Sound attenuation over ground cover 3 N82-34337
FORMALDEHYDE
Formaldehyde and other aldehydes [PB82-180498] N82-33909
FORMATIONS
Structural geometry of the Snake River Range, Idaho and Wyoming N82-33912
Magnetostratigraphy and magnetic properties of the Pliocene Glenns Ferry formation of southwest Idaho N82-33913
FORMING TECHNIQUES
Sphere forming method and apparatus [NASA-CASE-NPO-15070-1] N82-33567
FORMULATIONS
Research on fire-resistant diesel fuel [AD-A117408] N82-33550
FORTRAN
Users guide for SOL/QPSOL: A FORTRAN package for quadratic programming [AD-A117607] N82-34114
XERROR: The SLATEC error-handling package [DE82-015494] N82-34116
Nonalgebraic symbol manipulators for use in scientific and engineering modeling: Introducing the FORSE (FORTRAN Symbol Expander) [DE82-009818] N82-34118
FOSSIL FUELS
Preliminary study of in-situ combustion in diatomites [DE82-013272] N82-33862
Solar- and wind-powered irrigation systems [PB82-177486] N82-33887
Nitrogen oxide transformations in power-plant plumes [DE82-901847] N82-33897
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes [DE82-903730] N82-33898
FOULING
Five OTEC biofouling and corrosion experiments at Keahole Point, 1976 to 1980 [DE82-008086] N82-33987
FRACTURE MECHANICS
Fracture mechanics of delamination: Initiation and growth [AD-A115728] N82-33438
Fracture and fatigue characteristics in titanium alloys [AD-A117155] N82-33499
KQ measurements with rheometrics mechanical spectrometer [AD-A117903] N82-33781
FRACTURE STRENGTH
Correlations for the fracture of composite materials [PB82-181421] N82-33446
Effect of specimen size on the fracture toughness of Type 304 stainless steel [DE82-012517] N82-33517
Improved damage tolerance of titanium by adhesive lamination [NASA-TM-84525] N82-33737
FRACTURES (MATERIALS)
Modelling of deformation and fracture in high-temperature structural materials [DE82-013040] N82-33511
Fracto-emission from polymers [AD-A116786] N82-33535
Numerical analysis of hydraulically-driven fractures [DE82-015501] N82-33939
FRACTURING
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium [DE82-009289] N82-33673
FRAGMENTATION
Multiphoton ionization and fragmentation pathways of polyatomic molecules: Studies with a laser time-of-flight mass spectrometer N82-33457
Structures and fragmentation mechanics of the ions of ethanol by triple quadrupole mass spectrometry [AD-A117442] N82-34200
FRAMES
Synthesis of frameworks under multilevel performance constraints N82-33757
FREE ELECTRON LASERS
Electron drift in a linear magnetic wiggler with an axial guide field [AD-A115739] N82-33700
Design of the UCSB FEI electron beam system [AD-A115937] N82-33702
The effects of transverse gradient of static magnetic wigglers on the free electron laser [AD-A116968] N82-33704
FREE ENERGY
Anomalous reorganization free energies in optical electron transfer in solution [AD-A117680] N82-34202
FREEZING
A general climatological guide to daily freezing conditions: Frost days, ice days and freeze-thaw days [AD-A116771] N82-33952
FREON
The examination of electrical-breakdown properties of insulating gases used in electrostatic accelerators [DE82-009106] N82-33654
FREQUENCY ANALYZERS
A spectrum analyser for acoustic emission [AD-A117720] N82-33690
FREQUENCY MODULATION
Responses of FM/CW systems having filters [AD-A117371] N82-33617
Time-frequency and space-frequency characteristics of optical modulators [AD-A115650] N82-34221
FROST
A general climatological guide to daily freezing conditions: Frost days, ice days and freeze-thaw days [AD-A116771] N82-33952
FUEL CAPSULES
Spent fuel dry storage technology development: Electrically heated drywell storage test (3kW operation) [DE82-012567] N82-34216
FUEL CELL POWER PLANTS
Evaluation of natural gas molten carbonate fuel cell power plants [PB82-181272] N82-33881
FUEL CELLS
Mechanisms affecting mass transfer in fuel cells [DE82-013431] N82-33876
FUEL COMBUSTION
Atomization characteristics of coal-water mixtures [DE82-009093] N82-33477
Technical evaluation: Pressurized fluidized-bed combustion technology [DE82-014903] N82-33487
Low NOx heavy fuel combustor concept program [NASA-CR-165481] N82-33827
FUEL CONSUMPTION
Impact of advanced propeller technology on aircraft/mission characteristics of several general aviation aircraft [NASA-CR-167984] N82-33347
Exhaust emissions reduction for intermittent combustion aircraft engines [NASA-CR-167914] N82-33392
Advanced ceramic coating development for industrial/utility gas turbines [NASA-CR-169852] N82-33494
Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs and improve readiness [AD-A117935] N82-34296
FUEL CONTAMINATION
Advanced ceramic coating development for industrial/utility gas turbines [NASA-CR-169852] N82-33494
FUEL OILS
Conversion of waste plastics to fuel oil [DE82-002454] N82-33873
FUEL PRODUCTION
Exxon donor solvent coal liquefaction process [PB82-177460] N82-33490
FUEL SYSTEMS
Augmentor stability management program [AD-A117926] N82-33428
FUEL TANKS
High performance channel injection sealant invention abstract [NASA-CASE-ARC-14408-1] N82-33523
Seamless collapsible fuel tanks, phase 1 [AD-A116765] N82-33714
FUNCTION SPACE
Algebraic tests for functional controllability of functional differential equation systems [AD-A117032] N82-34149
FUNCTIONS (MATHEMATICS)
Logarithmic derivatives of two normalizing functions [AD-A117516] N82-34180
FUNGI
New data on metabolism and action mechanism of mycotoxins N82-33989
FUSELAGES
Crashworthy airframe design concepts: Fabrication and testing [NASA-CR-3603] N82-33735
FUSION REACTORS
Formation of z-discharged plasma channel in LIB-fusion device [IPPJ-601] N82-34255
Fusion engineering device. Volume 1: Mission and program summary [DE82-008931] N82-34267
Fusion engineering device. Volume 3: Test plan [DE82-008933] N82-34274
Fusion engineering device. Volume 4: Physics basis and physics R and D requirements [DE82-008934] N82-34275
Fusion engineering device. Volume 5: Technology R and D requirements for construction [DE82-008936] N82-34276

G

GALILEO PROBE
Light scattering calculations for the nephelometer experiment on the 1981/1982 Jupiter Orbiter-Probe mission [NASA-CR-169418] N82-34323
GALLIUM ARSENIDES
CO2 laser waveguiding in GaAs MBE layers [AD-A117394] N82-33708
Advanced on-board signal processor gallium arsenide memory [AD-A117151] N82-34091
Growth and Characterization of In(1-x)Ga(x) As(y)P(1-y) and GaAs using molecular beam epitaxy [AD-A117507] N82-34282
Radiation damage and annealing effects studies of silicon-implanted gallium arsenide [AD-A117884] N82-34284
GAME THEORY
Stochastic games. 1: Foundations [AD-A117085] N82-34177
GAMMA RAYS
Airborne gamma-ray spectrometer and magnetometer survey: Alturas Quadrangle, California [DE82-005539] N82-33805
GARNETS
A program of research on microfabrication techniques for VLSI magnetic devices [AD-A117922] N82-34281
GAS ANALYSIS
Coal gasification reactions with on-line in-situ FTIR analysis [DE82-005658] N82-33485
Particulate-analysis instrumentation for systems [DE82-012464] N82-33693
The aerospace long-path multiple reflection cell facility [SD-TR-82-60] N82-34218
GAS CHROMATOGRAPHY
Theoretical and practical considerations of some aspects of gas chromatographic optimization N82-33453
Research and development services: Methods development [AD-A117643] N82-34302
GAS DENSITY
Density measurement in air with saturable absorbing seed gas [NASA-CR-169420] N82-33919
GAS DISCHARGES
Pulsed excitation and collisional processes [AD-A116937] N82-33707
A scaling law of neutron yield for DT discharge in plasma focus [IPPJ-600] N82-34254
GAS DYNAMICS
A study of detonation structure: The formation of unreacted gas pockets [AD-A117849] N82-33553
GAS EVOLUTION
Flow characteristics in geopressured zones and salt water aquifers [PB82-181280] N82-33807
GAS FLOW
Low noise lead screw positioner [NASA-CASE-NPO-15617-1] N82-33681
GAS LASERS
Waveguide gas laser [AD-A115648] N82-33701
GAS POCKETS
A study of detonation structure: The formation of unreacted gas pockets [AD-A117849] N82-33553

GAS TUNGSTEN ARC WELDING
Real-time control of GMA welding
[PB82-204660] N82-33721
GMA welding experiments using real-time control
[PB82-204652] N82-33722
GAS TURBINE ENGINES
Engine dynamic analysis with general nonlinear finite element codes. Part 2: Bearing element implementation overall numerical characteristics and benchmaking
[NASA-CR-167944] N82-33390
Energy efficient engine: Turbine transition duct model technology report
[NASA-CR-167996] N82-33394
Overlay metallic-cermet alloy coating systems --- for gas turbine engines
[NASA-CASE-LEW-13639-1] N82-33522
GAS TURBINES
Survey and update of F-14A mission profiles for TF30 engine usage
[AD-A116831] N82-33337
Numerical stability analysis of a compressor model
[AD-A116878] N82-33396
Advanced ceramic coating development for industrial/utility gas turbines
[NASA-CR-169852] N82-33494
Long-term materials test program: Materials exposure test plan
[DE82-013322] N82-33516
System study of an MHD/gas turbine combined-cycle baseload power plant
[DE82-015215] N82-33869
GAS WELDING
Real-time control of GMA welding
[PB82-204660] N82-33721
GASES
The examination of electrical-breakdown properties of insulating gases used in electrostatic accelerators
[DE82-009106] N82-33654
Development of a direct-absorption high-temperature gas receiver
[DE82-010168] N82-33838
GASOLINE
Moessbauer spectroscopic and related characterization of Fischer-Tropsch catalysts
[DE82-009280] N82-33476
Exposure to atmospheric benzene vapour associated with motor gasoline
[PB82-174244] N82-34025
GAUSS EQUATION
Statistical analysis of upper ocean time series of vertical shear
[AD-A117286] N82-33969
GAUSS-MARKOV THEOREM
An experimental study of human pilot's scanning behavior N82-34044
GEAR TEETH
Mechanics of surface damage in elastohydrodynamic contacts
[AD-A117458] N82-33537
GENERAL AVIATION AIRCRAFT
Results from tests of three prototype general aviation seats
[NASA-TM-84533] N82-33733
Crashworthy airframe design concepts: Fabrication and testing
[NASA-CR-3603] N82-33735
GEOCHRONOLOGY
Part 1: Ancient arctic ice does not contain large excesses of natural lead. Part 2: Chronological variations in lead and barium concentrations and lead isotopic compositions in sediments of four southern California off-shore basins N82-33791
Structural geometry of the Snake River Range, Idaho and Wyoming N82-33912
The geologic record of climatic change
[NASA-TM-83956] N82-33946
GEOIDS
SEASAT satellite radar altimetry data processing system
[AD-A115972] N82-33797
Investigate the time evolution of the correlation between bathymetry and geoid height in the Pacific Ocean
[PB82-172099] N82-33944
Modeling and adjusting global ocean tides using SEASAT altimeter data
[AD-A115841] N82-33972
GEOLOGICAL SURVEYS
Grand Junction Area Office, United States Department of Energy 1980/1981 activities report
[DE82-009638] N82-33806
Hot-dry-rock geothermal resource 1980
[DE82-015082] N82-33863
GEOLOGY
Assessment of underground coal gasification in bituminous coals. Volume 1: Executive summary
[DE82-014584] N82-33557
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium
[DE82-009289] N82-33673
Applicability of factor analysis to the determination of mineral matter in coal N82-33790
Overseas Geology and Mineral Resources, number 55. Outline of the geology of Ecuador
[PB82-172784] N82-33815
Overseas Geology and Mineral Resources, number 58. An annotated bibliography of Ecuadorian geology
[PB82-172768] N82-33816
Geologic evolution of the Cordillera Darwin orogenic core complex, Southern Andes N82-33917
Calderas and mineralization: Volcanic geology and mineralization in the Chianti caldera complex, Trans-Pecos Texas
[DE82-013263] N82-33941
GEOMAGNETISM
Electron velocity shear instability in the auroral ionosphere
[AD-A116848] N82-33922
GEOMETRICAL THEORY OF DIFFRACTION
Numerical results of the theory of diffraction of radio waves around the surface of the Earth (selected sections)
[AD-A115668] N82-33801
GEOMETRY
Platonic plate tectonics: On the regularity of the distribution of triple points on the Earth's surface
[AD-A113777] N82-33931
GEOMORPHOLOGY
Active microwave remote sensing research program plan. Recommendations of the Earth Resources Synthetic Aperture Radar Task Force --- application areas: vegetation canopies, surface water, surface morphology, rocks and soils, and man-made structures
[NASA-CR-167726] N82-33596
GEOPHYSICS
Engineering geology and geomorphology of streambank erosion. Report 3: The application of waterborne geophysical techniques in fluvial environments
[AD-A115678] N82-33892
Computer storage and retrieval of position: Dependent data
[AD-A116767] N82-34095
Solar-geophysical data prompt reports, number 446. Part 1: Data for September 1981, August 1981 and late data. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-171075] N82-34331
Solar-geophysical data prompt reports, number 447. Part 1: Data for October 1981, September 1981 and late date. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-177726] N82-34332
Solar-geophysical data comprehensive reports, number 447. Part 2: Data for May 1981, February 1980 and miscellanea. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-177734] N82-34333
GEOPRESSURE
Flow characteristics in geopressured zones and salt water aquifers
[PB82-181280] N82-33807
GEOTECHNICAL ENGINEERING
Proof testing of a structural plate pipe with varying bedding and backfill parameters. Section 7, volume 1: Finite element analysis program modification and analysis of zone 2
[PB82-201526] N82-33587
GEOTHERMAL ENERGY UTILIZATION
Design of the Glenwood Springs downhole heat exchanger
[DE82-013809] N82-33855
Geothermal conversion at Veterans Hospital, Boise, Idaho
[DE82-012198] N82-33856
GEOTHERMAL RESOURCES
Hot-dry-rock geothermal resource 1980
[DE82-015082] N82-33863
GIANT STARS
Ultraviolet and X-ray detection of the 56 Peg system (KO 2p + WD)
[NASA-CR-169351] N82-34317
GLASS
The strength of weathered window glass using surface characteristics
[PB82-172735] N82-33546
Nonlinear analysis of rectangular glass plates by finite difference methods
[PB82-172552] N82-33547
Glass batch preheater: Phase 2. Laboratory testing
[PB82-180639] N82-33577
Screening tests of conformally-coated printed wiring boards
[DE82-012873] N82-33656
Attenuation of high intensity reradiated light by photochromic glass
[AD-A117424] N82-34227
GLASS COATINGS
Method for repair of thin glass coatings --- on space shuttle orbiter tiles
[NASA-CASE-KSC-11097-1] N82-33520
GLASS FIBER REINFORCED PLASTICS
Hygrothermal effects on the micromechanisms of crack extension in glass fibre and carbon fibre composites
[PB82-176728] N82-33447
GLASS FIBERS
Mechanical properties of E293/1581 fiberglass-epoxy composite and several adhesive systems
[AD-A117902] N82-33442
Fluoropolymer barriers to stress corrosion in optical fibers
[AD-A117346] N82-34224
GLIDE LANDINGS
TRACALS evaluation report. Special report: A procedure for RTT position improvement using linear regression analysis of glide slope structure
[AD-A115926] N82-33365
GLIDE PATHS
TRACALS evaluation report. Special report: A procedure for RTT position improvement using linear regression analysis of glide slope structure
[AD-A115926] N82-33365
Analysis of several glidepath and speed control autopilot concepts for a powered lift STOL aircraft
[NASA-TM-84282] N82-33400
GLIDING
Development of methods for assessment of gliding parachute applications
[AD-A117103] N82-33356
GLOBAL POSITIONING SYSTEM
Prototype design and initial test evaluation of a Global Positioning System Time Transfer Receiver (GPS TTR)
[NASA-TM-84721] N82-33364
GLUCOSE
Insulin resistance for glucose metabolism in disused soleus muscle of mice
[NASA-CR-169353] N82-33979
GOGGLES
Cold weather goggles. Part 3: Resistance to fogging
[AD-A115898] N82-34078
GOVERNMENT PROCUREMENT
Establishing a reliable source of fuel for Department of Defense requirements: Effective petroleum, oil and lubricant financial management
[PB82-170812] N82-34299
GOVERNMENT/INDUSTRY RELATIONS
The need for a fifth Space Shuttle orbiter
[GPO-96-894] N82-33418
GOVERNMENTS
Improving government information resources management
[PB82-183542] N82-34305
GRAIN BOUNDARIES
Diffraction and microscopy studies of the structure of grain boundaries in Fe, Fe-base alloys, and ceramic materials
[DE82-009553] N82-34287
GRAPH THEORY
Octree generation, analysis and manipulation
[AD-A117450] N82-34112
GRAPHITE
Development of a high conductivity intercalated graphite composite wire
[DE82-008973] N82-33655
GRAPHITE-EPOXY COMPOSITES
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N82-33436
Accelerated fatigue durability of a high performance composite
[NASA-CR-166407] N82-33437
Fracture mechanics of delamination: Initiation and growth
[AD-A115728] N82-33438
Prediction of residual tensile strength of transversely impacted composite laminates N82-33745
Theoretical studies of radiation effects in composite materials for space use --- graphite-epoxy composites
[NASA-CR-3618] N82-34335
GRAPHS (CHARTS)
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899
Optimization algorithms on random graphs
[AD-A115804] N82-34140
GRAVITATIONAL FIELDS
Interpretation of the Earth's gravity field N82-33911

GRAVITY ANOMALIES
Interpretation of the Earth's gravity field N82-33911
Description of a magnetic tape containing the principal facts of approximately 64000 gravity stations in the State of California
[PB82-168279] N82-33943

GRAVITY GRADIOMETERS
Description of a magnetic tape containing the principal facts of approximately 64000 gravity stations in the State of California
[PB82-168279] N82-33943

GRAVITY WAVES
Design and laboratory testing of a prototype linear temperature sensor
[AD-A117245] N82-33688
Observations of vertically propagating equatorially-trapped waves in the deep western Indian Ocean
[NASA-CR-169375] N82-33974

GREEN FUNCTION
Spectral equivalence of deterministic and stochastic models for time series with a periodic component
[AD-A117718] N82-34179

GROUND BASED CONTROL
A ground-simulator investigation of helicopter longitudinal flying qualities for instrument approach
[NASA-TM-84225] N82-33398

GROUND EFFECT MACHINES
Lift system and fan performance of air cushion supported vehicles
[AD-A117363] N82-33570

GROUND STATIONS
Earth station interface for demand assignment applications
[AD-A117721] N82-33627

GROUND SUPPORT EQUIPMENT
Automated Low-cost Weather Observation System (ALWOS)
[AD-A117447] N82-33954

GROUND SUPPORT SYSTEMS
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 1: Executive summary
[NASA-CR-162079] N82-34127

GROUND WATER
Coal mining and ground-water resources in the United States
[PB82-182056] N82-33903

GROUP DYNAMICS
Experimental analysis of team performance: Methodological developments and research results
[AD-A116915] N82-34034
A model of subjective probabilities from small groups N82-34054

GROWTH
Stimulation of body weight increase and epiphyseal cartilage growth by insulin like growth factor
[NASA-TM-84285] N82-33983

GUIDANCE (MOTION)
Levels of steering control: Reproduction of steering-wheel movements N82-34071

GUIDE VANES
Energy efficient engine: Turbine transition duct model technology report
[NASA-CR-167996] N82-33394

GULFS
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973

GUN PROPELLANTS
Explosives instrumentation group trial 6/77-propellant fire trials (series 2)
[AD-A117695] N82-33555

GUN TURRETS
Universal turret system model determination and controller performance testing
[AD-A117687] N82-33380

GUNS (ORDNANCE)
Aerodynamic loads on a ball-obturated tubular projectile
[AD-A115756] N82-33349

GYPSUM
Evaluation of the use of foam for dust control on face drills and crushers
[PB82-176215] N82-33809

GYRATION
Reflections on an F-43 in flight emergency
[AD-A116873] N82-33358

H

HABITABILITY
Terrestrial biological inventory, Hillview Drainage and Levee District, Greene and Scott Counties, Illinois
[AD-A115911] N82-33800

HABITATS
Terrestrial biological inventory, Hillview Drainage and Levee District, Greene and Scott Counties, Illinois
[AD-A115911] N82-33800

HALF LIFE
Positron annihilation spectroscopy with magnetically analyzed beams
[NASA-TM-84535] N82-33435

HANDBOOKS
Reference book for the nitrogen industry worker in two volumes, volume 1
[AD-A115651] N82-33569

HARDENING (MATERIALS)
Ultrasonic measurement of case depth in case hardened steels. Evaluation of feasibility for the ultrasonic measurement of case depth in case hardened steels
[AD-A117901] N82-33505

HARMONIC ANALYSIS
Perturbation of homoclinics and subharmonics in Duffing's equation
[AD-A117390] N82-34152

HARMONIC EXCITATION
Responses to harmonic acceleration with varying head positions
[AD-A114736] N82-34010

HARMONIC GENERATORS
An analytical solution to the problems of 3-phonon interaction and second harmonic generation in a solid plate
[AD-A117907] N82-34195

HARMONIC OSCILLATION
Near millimeter wave radiation from a gyromonotron
[AD-A117301] N82-33703

HARMONIC OSCILLATORS
Simple way of solving the hydrogen atom problem
[DE82-700020] N82-34204

HAZARDS
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981
[PB82-176967] N82-33966

HEAD (ANATOMY)
A dynamic model of the cervical spine and head
[AD-A114887] N82-34008
Responses to harmonic acceleration with varying head positions
[AD-A114736] N82-34010

HEAD-UP DISPLAYS
An Operational evaluation of head up displays for civil transport operations. NASA/FAA phase 3 report
[NASA-TP-1815] N82-33381
Application of a pilot control strategy identification technique to a joint FAA/NASA ground-based simulation of head-up displays for CTOL aircraft N82-34061
Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle N82-34062

HEALTH PHYSICS
Guidelines for the determination of atmospheric conditions of oil mists
[PB82-174251] N82-33908

HEART RATE
Ventilatory responses to exercise while eliciting the relaxation response
[AD-A115102] N82-34015

HEAT
Acute albumin-induced plasma volume expansion and exercise in the heat: Effects on hormonal responses in men
[AD-A115180] N82-34017

HEAT EXCHANGERS
An assessment of heat-transfer correlations for turbulent water flow through a pipe at Prandtl numbers of 6.0 and 11.6
[DE82-014426] N82-33677
Design of the Glenwood Springs downhole heat exchanger
[DE82-013809] N82-33855

HEAT FLUX
Apparatus development for measuring heat flux in a direct coal-liquefaction preheater
[DE82-012013] N82-33692

HEAT GENERATION
Interaction of heat production, strain rate and stress power in a plastically deforming body under tensile test N82-33746

HEAT MEASUREMENT
Calorimetric measurements of emittance of pipe surfaces: Influence of enclosure diameter, test pipe length and an argon atmosphere
[DE82-009404] N82-33675
Design and operation of an apparatus for calorimetric emittance measurements of pipe surfaces
[DE82-008713] N82-33676

HEAT RESISTANT ALLOYS
Modelling of deformation and fracture in high-temperature structural materials
[DE82-013040] N82-33511
Overlay metallic-cermet alloy coating systems — for gas turbine engines
[NASA-CASE-LEW-13639-1] N82-33522
Practical applications of hot-isostatic pressing diagrams: Four case studies
[PB82-182338] N82-33574

HEAT SHIELDING
Mechanical fastener
[NASA-CASE-LAR-12738-1] N82-33419

HEAT SOURCES
Optimal staging of endoreversible heat engines
[DE82-900742] N82-33841
Ocean thermal energy conversion, fiscal year 1981. Public Law 96-320 N82-33888

HEAT STORAGE
Development of a long-life high-temperature catalyst for the SO2/SO3 energy-storage system
[DE82-009723] N82-33840
Energy storage using phase-change materials for active solar heating and cooling: An evaluation of future research and development direction
[DE82-014856] N82-33857
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865

HEAT TOLERANCE
Microclimate cooling for combat vehicle crewmen
[AD-A117156] N82-34083

HEAT TRANSFER
Numerical solution of an ill-posed problem arising in wind tunnel heat transfer data reduction
[AD-A117572] N82-33409
Containerless processing technology analysis
[NASA-CR-170624] N82-33430
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672
An assessment of heat-transfer correlations for turbulent water flow through a pipe at Prandtl numbers of 6.0 and 11.6
[DE82-014426] N82-33677
Computation of two-dimensional time-dependent natural convection of compressible fluid in a rectangular enclosure
[PB82-198797] N82-33679
Apparatus development for measuring heat flux in a direct coal-liquefaction preheater
[DE82-012013] N82-33692
A novel boundary element method program for heat transfer analysis of composite materials N82-33748
Home retrofitting for energy conservation and solar considerations
[DE82-013420] N82-33860

HEAT TRANSFER COEFFICIENTS
An assessment of heat-transfer correlations for turbulent water flow through a pipe at Prandtl numbers of 6.0 and 11.6
[DE82-014426] N82-33677

HEAT TREATMENT
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501
Review of recent irradiation-creep results
[DE82-014570] N82-33512

HEATING
Glass batch preheater: Phase 2. Laboratory testing
[PB82-180639] N82-33577

HEATING EQUIPMENT
Weld thermal simulator
[PB82-207283] N82-33583
Apparatus development for measuring heat flux in a direct coal-liquefaction preheater
[DE82-012013] N82-33692
Spent fuel dry storage technology development: Electrically heated drywell storage test (3kW operation)
[DE82-012567] N82-34216

HELICAL WINDINGS
Helical magnetic configurations produced with the help of ferromagnetic materials. 2: The Helimag
[IPPJ-591] N82-34243

HELICOPTER DESIGN
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-169352] N82-33374

HELICOPTER PERFORMANCE
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357
A ground-simulator investigation of helicopter longitudinal flying qualities for instrument approach
[NASA-TM-84225] N82-33398

HELICOPTERS
Finite difference modeling of rotor flows including wake effects
[NASA-TM-84280] N82-33345
Northeast corridor helicopter area navigation accuracy evaluation
[AD-A117445] N82-33367
Speech Command Auditory Display System (SCADS)
[AD-A117486] N82-33387
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-3619] N82-33734
HELIUM AFTERGLOW
Pulsed excitation and collisional processes
[AD-A116937] N82-33707
HERMETIC SEALS
Glass-to-metal seal quality
[AD-A117598] N82-33718
HETERODYNING
A synchronous phase detection system for an optical interferometric sensor
[AD-A117435] N82-34229
HEURISTIC METHODS
An O(NlogN) planar travelling salesman heuristic based on spacefilling curves
[AD-A115357] N82-34136
The strength of surrogate constraints for the linear zero-one integer programming problem
[AD-A115736] N82-34137
HIGH ASPECT RATIO
High-aspect-ratio silicon-cell metallization
[DE82-011687] N82-33861
HIGH ENERGY INTERACTIONS
Inelastic strong interactions at high energies
[DE82-007984] N82-34215
HIGH FREQUENCIES
HF wideband modem
[AD-A116859] N82-33603
HIGH LEVEL LANGUAGES
Data flow computer architecture
[DE82-014632] N82-34098
HIGH POWER LASERS
A new midinfrared laser in hydrogen
[AD-A117162] N82-33705
HIGH STRENGTH STEELS
Effects of residual impurities on hydrogen assisted cracking in high strength steels
[AD-A116966] N82-33497
Effects of residual impurities on hydrogen assisted cracking in high strength steels, part 1
[AD-A116948] N82-33498
HIGH TEMPERATURE
Fundamental research directed to advanced high temperature coating systems beyond the current state-of-the-art systems
[AD-A117845] N82-33504
Review of recent irradiation-creep results
[DE82-014570] N82-33512
Residual energy application program: Utilization of high-temperature waste heat by means of Rankine-cycle engines. A technical summary
[DE82-010376] N82-33839
HIGH TEMPERATURE TESTS
Design and evaluation of a pressure sensor for high temperature nuclear application
[EGG-2135] N82-33682
HIGHWAYS
Proof testing of a structural plate pipe with varying bedding and backfill parameters. Section 7, volume 1: Finite element analysis program modification and analysis of zone 2
[PB82-201526] N82-33587
Design of overlays based on pavement condition, roughness, and deflections
[PB82-201369] N82-33588
The Catskill-Cairo experimental rigid pavement: A ten-year progress report
[PB82-201229] N82-33589
HISTORIES
Recent progress in VSTOL technology
[NASA-TM-84238] N82-33334
James Clerk Maxwell's Cambridge manuscripts: Extracts relating to control and stability, part 1
[PB82-180571] N82-34160
HOLOGRAMMETRY
White light optical processing and holography
[AD-A117506] N82-33689
HOLOGRAPHY
Optical Studies of model binary miscibility gap system
[NASA-TM-82494] N82-33683
Electron beam generated holographic optical element research
[AD-A117052] N82-33685
HOMING DEVICES
Photonic seeker development
[AD-A117160] N82-34225
HOMOTOPY THEORY
Minimization versus homotopy algorithms N82-33741
HORIZONTAL FLIGHT
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357
HOSPITALS
Geothermal conversion at Veterans Hospital, Boise, Idaho
[DE82-012198] N82-33856
HOT PRESSING
Practical applications of hot-isostatic pressing diagrams: Four case studies
[PB82-182338] N82-33574
HOVERING
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357
HUMAN BEINGS
Comparison of rhesus and human spectral dynamic visual acuity
[AD-A115258] N82-34018
HUMAN FACTORS ENGINEERING
The AIDS/F-18 diffractive HUD
[AD-A116026] N82-33382
Speech Command Auditory Display System (SCADS)
[AD-A117486] N82-33387
Results from tests of three prototype general aviation seats
[NASA-TM-84533] N82-33733
Stress, anxiety, and cognitive interference: Reactions to tests
[AD-A113564] N82-34031
The effect of stimulus-central processing-response compatibility and resource competition on pilot performance
[AD-A113754] N82-34032
Parametric identification of human operator models N82-34045
Analysis of driver performance under reduced visibility N82-34075
A computer aided workstation assesor for crew operations - WOSTAS
[AD-A116045] N82-34079
A systems approach for crew station design and evaluation
[AD-A115663] N82-34080
Blue Flight Coverall Program
[AD-A116856] N82-34082
Repeated measures of human performance: A bag of research tools
[AD-A113954] N82-34084
Evaluation of four-color plan view display console
[AD-A117897] N82-34085
A pilot study of human factors in SAR
[AD-A117917] N82-34087
HUMAN PERFORMANCE
Airsickness during Naval flight officer training: Advanced Squadron VT86-RIO (new syllabus)
[AD-A114685] N82-34011
Stress, anxiety, and cognitive interference: Reactions to tests
[AD-A113564] N82-34031
The effect of stimulus-central processing-response compatibility and resource competition on pilot performance
[AD-A113754] N82-34032
Experimental analysis of team performance: Methodological developments and research results
[AD-A116915] N82-34034
A performance analysis study of a complex G field experiment N82-34056
PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066
Supervision of dynamic systems: Monitoring, decision-making and control N82-34069
Effects of motivation on car-following N82-34070
A comparison of control modes for time-delayed remote manipulation N82-34072
Analysis of driver performance under reduced visibility N82-34075
Repeated measures of human performance: A bag of research tools
[AD-A113954] N82-34084
HUMAN TOLERANCES
Effects of prior physical exertion on tolerance to hypoxia, orthostatic stress, and physical fatigue
[AD-A114741] N82-34009
HYDRATES
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A117080] N82-33549
HYDRAULIC CONTROL
Loading and unloading resin from MPPF rapid ion exchange columns
[DP-1609] N82-33458
HYDRAULIC EQUIPMENT
Loading and unloading resin from MPPF rapid ion exchange columns
[DP-1609] N82-33458
HYDRAULIC FLUIDS
Feasibility study: Hollow plastic spheres to increase hydraulic fluid compressibility
[NASA-CR-169374] N82-33539
HYDRAULICS
Numerical analysis of hydraulically-driven fractures
[DE82-015501] N82-33939
HYDROCARBONS
Exhaust emissions reduction for intermittent combustion aircraft engines
[NASA-CR-167914] N82-33392
Hydrocarbon fuel chemistry: Sediment water interaction
[AD-A117928] N82-33552
HYDROCHLORIC ACID
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A117080] N82-33549
HYDROELASTICITY
Mechanics of surface damage in elastohydrodynamic contacts
[AD-A117458] N82-33537
HYDROGEN
Thermal desorption of H2 and CO on Pt/TiO2
[AD-A117888] N82-33466
Solvent Refined Coal (SRC) Process. Effect of mixing energy on hydrogen reaction rates in SRC-11 reactors
[DE82-008447] N82-33481
HYDROGEN ATOMS
Simple way of solving the hydrogen atom problem
[DE82-700020] N82-34204
HYDROGEN CHLORIDES
A new midinfrared laser in hydrogen
[AD-A117162] N82-33705
HYDROGEN EMBRITTLEMENT
Effects of residual impurities on hydrogen assisted cracking in high strength steels
[AD-A116966] N82-33497
Effects of residual impurities on hydrogen assisted cracking in high strength steels, part 1
[AD-A116948] N82-33498
An example of the effect of hydrogen trapping on hydrogen embrittlement
[AD-A116299] N82-34106
HYDROGEN PRODUCTION
Thermochemical water-splitting for hydrogen production
[PB82-208174] N82-33560
HYDROGENATION
Hydroprocessing of solvent-refined coal: Catalyst-screening results
[DE82-008568] N82-33479
Studies of metal: Semiconductor interfaces in catalysis and energy conversion
[DE82-011863] N82-33509
HYDROGEOLOGY
The marine geology of the Bahama Escarpment N82-33916
HYDROLOGY
Evaporation in Relation to Hydrology
[PB82-176108] N82-33814
HYDROXYL RADICALS
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472
HYPERBOLIC FUNCTIONS
Existence of a global weak solution to the nonlinear waterhammer program
[DE82-010717] N82-33678
HYPERTHERMIA
Hyperthermia heating apparatus --- cancer therapy
[NASA-CASE-NPO-14549-2] N82-33996
HYPOKINESIA
Insulin resistance for glucose metabolism in disused soleus muscle of mice
[NASA-CR-169353] N82-33979
HYPOTHERMIA
Effectiveness of ice (water) packets vests in reducing heat stress
[AD-A117864] N82-34021
HYPOXIA
Effects of prior physical exertion on tolerance to hypoxia, orthostatic stress, and physical fatigue
[AD-A114741] N82-34009

I

ICE
Practical applications of hot-isostatic pressing diagrams: Four case studies
[PB82-182338] N82-33574
A general climatological guide to daily freezing conditions: Frost days, ice days and freeze-thaw days
[AD-A116771] N82-33952
Effectiveness of ice (water) packets vests in reducing heat stress
[AD-A117864] N82-34021

ICE FORMATION
Sea ice rubble formations in the Bering Sea and Norton Sound, Alaska
[AD-A113773] N82-33801
Ice forming experiment
[NASA-CR-170623] N82-33948

ICE MAPPING
NORSEX 1979 microwave remote sensing data report
[NASA-CR-165967] N82-33796

IDAHO
Magnetostratigraphy and magnetic properties of the Pliocene Glenns Ferry formation of southwest Idaho N82-33913

IGNITION SYSTEMS
Stand-alone ignition devices
[PB82-180662] N82-33488

ILLUMINATING
Illumination from space with orbiting solar-reflector spacecraft
[NASA-TP-2065] N82-33421

IMAGE CONVERTERS
Applying photogrammetry to real time collection of digital image data
[AD-A116770] N82-33687

IMAGE CORRELATORS
Photonic seeker development
[AD-A117160] N82-34225

IMAGE PROCESSING
Applications of texture analysis for rock types discrimination
[AD-A117076] N82-33798
Analysis of remote sensing data collected for detection and mapping of oil spills: Reduction and analysis of multi-sensor airborne data of the NASA Wallops oil spill exercise of November 1978
[NASA-CR-165886] N82-33891
Some computer applications and digital image processing in nuclear medicine N82-34000
Interactive digital image processing for terrain data extraction
[AD-A116881] N82-34107
Cellular architectures for pattern recognition
[AD-A117049] N82-34110
Photonic seeker development
[AD-A117160] N82-34225
Optical computations for image bandwidth compression
[AD-A117722] N82-34233

IMAGE RECONSTRUCTION
Registration of digitized aerial photography with a digital map data base
[AD-A117510] N82-33803

IMAGE TUBES
Intagliated phosphor screen image tube project
[NASA-CR-170445] N82-33635

IMAGES
An analysis of the max-min texture measure
[AD-A116768] N82-33799
Optical computations for image bandwidth compression
[AD-A117722] N82-34233

IMAGING TECHNIQUES
Computer graphic representation of remote environment using position tactile sensors
[AD-A116912] N82-34111

IMPACT
An assessment of the impact of the Department of Defense very high speed integrated circuit program
[AD-A117459] N82-33646

IMPACT DAMAGE
A study of the nature of solid particle impact and shape on the erosion morphology of ductile metals
[NASA-TM-82933] N82-33493

IMPACT LOADS
Extensional collapse modes of structural members N82-33765

IMPACT STRENGTH
Research in structural and solid mechanics, 1982
[NASA-CP-2245] N82-33739
Prediction of residual tensile strength of transversely impacted composite laminates N82-33745

IMPINGEMENT
A study of the nature of solid particle impact and shape on the erosion morphology of ductile metals
[NASA-TM-82933] N82-33493

IMPURITIES
Effects of residual impurities on hydrogen assisted cracking in high strength steels
[AD-A116966] N82-33497
Effects of residual impurities on hydrogen assisted cracking in high strength steels, part 1
[AD-A116948] N82-33498
Probe measurements for impurity transport in the scrape-off layer of JIPP T-II
[IPPJ-590] N82-34239
All coated limited experiment in the JIPP T-II Tokamak
[IPPJ-593] N82-34241
Wall material characteristics in reacting plasma modelling
[IPPJ-592] N82-34242

INCOHERENCE
White light optical processing and holography
[AD-A117506] N82-33689

INCOME
Private financing and operation of a space station: Investment requirements, risk, government support and other primary business management considerations
[NASA-CR-169357] N82-34291

INCOMPRESSIBLE FLOW
Separated diffuser flow analysis, volume 1
[AD-A117668] N82-33669
Incompressible flow in a rapidly rotating cylinder with a source/sink distribution in the lateral wall and a free inner boundary
[DE82-011031] N82-33674

INCONEL (TRADEMARK)
Hot tensile tests of Inconel 718
[NASA-CR-162089] N82-33496

INDEXES (DOCUMENTATION)
Energy laboratory data and model directory
[PB82-180274] N82-33884

INDIAN OCEAN
Observations of vertically propagating equatorially-trapped waves in the deep western Indian Ocean
[NASA-CR-169375] N82-33974

INDIUM ALLOYS
Growth and Characterization of In(1-x)Ga(x) As(y)P(1-y) and GaAs using molecular beam epitaxy
[AD-A117507] N82-34282

INDUSTRIAL ENERGY
The potential for industrial cogeneration development by 1990
[RA-81-1455] N82-33822
Assessment of energy saving technologies with potential for applications in US industries
[DE82-012571] N82-33874

INDUSTRIAL PLANTS
Conversion of ammonia plants to methanol production
[PB82-177494] N82-33489
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes
[DE82-903730] N82-33898

INDUSTRIAL SAFETY
Toxicity of silicon compounds
[DE82-014245] N82-34022

INDUSTRIAL WASTES
Spherical agglomeration of flocculated precipitate
[NRC/CNR-TT-2024] N82-33462
Development of a waste-to-energy plan: City of Columbia, Missouri
[DE82-009288] N82-33850
Conversion of waste plastics to fuel oil
[DE82-002454] N82-33873
Sampling of liquid effluents from refineries
[PB82-174657] N82-33906

INDUSTRIES
Reference book for the nitrogen industry worker in two volumes, volume 1
[AD-A115651] N82-33569
An assessment of the impact of the Department of Defense very high speed integrated circuit program
[AD-A117459] N82-33646
World mineral statistics 1975-79: Production, exports, imports
[PB82-172842] N82-33811
Evaluation of natural gas molten carbonate fuel cell power plants
[PB82-181272] N82-33881
Competition in the photovoltaics industry: A question of balance
[PB82-171570] N82-33886
Private financing and operation of a space station: Investment requirements, risk, government support and other primary business management considerations
[NASA-CR-169357] N82-34291

INELASTIC SCATTERING
Inelastic interactions of 4.5 GeV/c protons with emulsion nuclei not accompanied by relativistic charged particles
[DE82-701020] N82-34207
Inelastic strong interactions at high energies
[DE82-007984] N82-34215

INEQUALITIES
Inequalities on distributions: Bivariate and multivariate
[AD-A116814] N82-34163

INFERENCE
Autoregressive spectral estimation and functional inference
[AD-A117113] N82-34173

INFINITY
Structure and Smith-MacMillan form of a rational matrix at infinity
[PB82-178625] N82-34159

INFORMATION DISSEMINATION
The Shock and Vibration Digest, volume 14, no. 1
[AD-A111336] N82-33561
Improving government information resources management
[PB82-183542] N82-34305

INFORMATION FLOW
Data flow computer architecture
[DE82-014632] N82-34098

INFORMATION MANAGEMENT
A system for assessing user response to NAVPERRANDCEN RDT/E products
[AD-A117719] N82-34297
Improving government information resources management
[PB82-183542] N82-34305

INFORMATION RETRIEVAL
Category and word search: Generalizing search principles to complex processing
[AD-A115130] N82-34301
Improving government information resources management
[PB82-183542] N82-34305

INFORMATION SYSTEMS
Information display systems. Summary of project status
[DE82-009971] N82-34304

INFRARED ABSORPTION
A method of polymer design and synthesis for selective infrared energy absorption
[AD-A117485] N82-33540

INFRARED ASTRONOMY
Catalog of infrared observations
[NASA-TM-83819] N82-34319
Identification of the emission features near 3.5 microns in the pre main sequence star HD 97048
[NASA-CR-169379] N82-34320

INFRARED IMAGERY
An evaluation of the relative performance of three infrared imagers through fog
[AD-A116893] N82-34222

INFRARED LASERS
A new midinfrared laser in hydrogen
[AD-A117162] N82-33705
Research directed at developing a classical theory to describe isotope separation of polyatomic molecules illuminated by intense infrared radiation
[DE82-009652] N82-34208

INFRARED PHOTOGRAPHY
Some practical aspects on the infra-red thermography of buildings
[PB82-174517] N82-33576

INFRARED RADIATION
Characterization of infrared optical properties of layered semiconductors
[AD-A117729] N82-34285
Identification of the emission features near 3.5 microns in the pre main sequence star HD 97048
[NASA-CR-169379] N82-34320

INFRARED SCANNERS
An evaluation of the relative performance of three infrared imagers through fog
[AD-A116893] N82-34222

INFRARED SPECTRA
Photoacoustic spectroscopy at visible and infrared wavelengths N82-33448

INFRARED SPECTROSCOPY
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472
Coal gasification reactions with on-line in-situ FTIR analysis
[DE82-005658] N82-33485

INFRARED TRACKING
Time-frequency and space-frequency characteristics of optical modulators
[AD-A115650] N82-34221

INHOMOGENEITY
Effect of ground terrain on millimeter wave propagation
[AD-A116837] N82-33614

INJECTION
High performance channel injection sealant invention abstract
[NASA-CASE-ARC-14408-1] N82-33523

INJECTORS
BNL neutral-beam development group
[DE82-008852] N82-34266

INJURIES
Research on the development of a statistical impact acceleration injury prediction model from -G(x) accelerator runs
[AD-A116440] N82-34003

INSOLATION
Intermediate photovoltaic system application experiment operational performance. Volume 8: Newman Power Station, El Paso, Texas
[DE82-014247] N82-33858
Environmental data for sites in the national solar data network
[DE82-008076] N82-33959

INSPECTION
Resolution of contamination problems affecting laser surface certification inspection
[DE82-008775] N82-33711
Development of nondestructive testing technique. Ultrasonic testing and radiographic testing
[DE82-700448] N82-33726

INSTAL'.ING
Development of avionics installation interface standards
[AD-A116853] N82-33384

INSTRUMENT APPROACH
A ground-simulator investigation of helicopter longitudinal flying qualities for instrument approach
[NASA-TM-84225] N82-33398

INSTRUMENT FLIGHT RULES
FAA air traffic activity, FY 1981
[PB82-200361] N82-33371
The effects of pilot experience of acquiring instrument flight skills, phase 2
[AD-A113576] N82-34033

INSULATORS
The examination of electrical-breakdown properties of insulating gases used in electrostatic accelerators
[DE82-009106] N82-33654

INSULIN
Insulin resistance for glucose metabolism in disused soleus muscle of mice
[NASA-CR-169353] N82-33979
Stimulation of body weight increase and epiphyseal cartilage growth by insulin like growth factor
[NASA-TM-84285] N82-33983

INTEGRAL CALCULUS
A simple quadrature formula from Simpson's rule applicable for odd or even n
[AD-A116867] N82-34148

INTEGRAL EQUATIONS
Numerical solution of an ill-posed problem arising in wind tunnel heat transfer data reduction
[AD-A117572] N82-33409

INTEGRATED CIRCUITS
A SPICE2 model for the M732 analog timer integrated circuit
[AD-A117012] N82-33643
CO2 laser waveguiding in GaAs MBE layers
[AD-A117394] N82-33708

INTELSAT 5 SATELLITE
INTELSAT V-E(F-5)
[NASA-TM-84857] N82-33413

INTERCALATION
Development of a high conductivity intercalated graphite composite wire
[DE82-008973] N82-33655

INTERFACES
Studies in on-line reversed phase liquid chromatography/mass spectrometry N82-33452
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859

INTERFACIAL TENSION
Sphere forming method and apparatus
[NASA-CASE-NPO-15070-1] N82-33567

INTERFEROMETERS
Low noise lead screw positioner
[NASA-CASE-NPO-15617-1] N82-33681
A synchronous phase detection system for an optical interferometric sensor
[AD-A117435] N82-34229

INTERGRANULAR CORROSION
Hot tensile tests of Inconel 718
[NASA-CR-162089] N82-33496

INTERIOR BALLISTICS
Wind-tunnel drag measurements of a ball-obturated tubular projectile
[AD-A117268] N82-33351

INTERNATIONAL SYSTEM OF UNITS
Metric conversion in the United States N82-33568

INTERNATIONAL TRADE
World mineral statistics 1975-79: Production, exports, imports
[PB82-172842] N82-33811
Technology transfer in New Mexico
[GPO-85-343] N82-34309

INTERPOLATION
Accurate monotonicity-preserving cubic interpolation
[DE82-009964] N82-34157

INTERPROCESSOR COMMUNICATION
The DMS multiprocess execution environment
[AD-A117660] N82-34096

INTERRUPTION
Interruptible supersaturated two-level designs
[AD-A115786] N82-34181

INTESTINES
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994

INVENTIONS
The Montana Energy and MHD Development Institute, Inc.
[PB82-176926] N82-33885

INVENTORIES
Terrestrial biological inventory, Hillview Drainage and Levee District, Greene and Scott Counties, Illinois
[AD-A115911] N82-33800

INVENTORY MANAGEMENT
Palm's theorem for nonstationary processes
[AD-A117089] N82-34135
Production lot sizing and the power of 2
[AD-A116929] N82-34292
MISIL, too big to fly
[AD-A117940] N82-34303

INVERSE SCATTERING
The inverse scattering problem for acoustic waves
[AD-A117048] N82-34193
Lax-pair operators for squared eigenfunctions in the inverse scattering transformations
[IPPJ-589] N82-34244
Alternative representations of the inverse scattering transformation for the K-d V equation and the modified K-d equation
[IPPJ-581] N82-34248
Interrelation of alternative sets of Lax-pairs for a generalized nonlinear Schroedinger equation --- in relation to soliton physics
[IPPJ-585] N82-34251

INVERSIONS
Marine atmospheric boundary layer and inversion forecast model
[AD-A115769] N82-33949

INVESTMENT CASTING
Zirconium oxide molds for small molybdenum investment castings
[PB82-202995] N82-33519

INVESTMENTS
Private financing and operation of a space station: Investment requirements, risk, government support and other primary business management considerations
[NASA-CR-169357] N82-34291

INVISCID FLOW
An inviscid computational method for tactical missile configurations
[AD-A116904] N82-33415

IO
A primer on sulfur for the planetary geologist
[NASA-CR-3594] N82-33459
A theory of the Io phase asymmetry of the Jovian decametric radiation
[NASA-TM-83994] N82-34325

IODINE COMPOUNDS
Thermochemical water-splitting for hydrogen production
[PB82-208174] N82-33560

ION BEAMS
Effect of magnetic shear on the electrostatic ion cyclotron waves in magnetospheric plasmas
[NASA-CR-169229] N82-34183
Negative-ion-beam generation with the ORNL SITEX source
[DE82-016042] N82-34211
Determination of metastable fraction in an ion beam extracted from ECR plasma
[IPPJ-580] N82-34236
Formation of z-discharged plasma channel in LiB-fusion device
[IPPJ-601] N82-34255

ION CYCLOTRON RADIATION
High energy tail production by higher harmonic frequency up to 5 omega ci
[AD-B067129] N82-34250
Propagation characteristics in a magnetized plasma-waveguide near the ion cyclotron frequency
[IPPJ-598] N82-34253

ION DENSITY (CONCENTRATION)
Multi-ion interactions and defects in metals
[AD-A117451] N82-33502

ION EMISSION
Fracto-emission from polymers
[AD-A116786] N82-33535

ION EXCHANGE RESINS
Loading and unloading resin from MPPF rapid ion exchange columns
[DP-1609] N82-33458

ION EXCHANGING
Loading and unloading resin from MPPF rapid ion exchange columns
[DP-1609] N82-33458

ION EXTRACTION
Studies on the syntheses of boron hydride systems
[AD-A115817] N82-33467
Selective metal-ion extraction for multiple-ion liquid-liquid exchange reactions
[DE82-011721] N82-33474

ION IMPLANTATION
Radiation damage and annealing effects studies of silicon-implanted gallium arsenide
[AD-A117884] N82-34284

ION SELECTIVE ELECTRODES
Equilibrium noise in ion selective field effect transistors
[AD-A117525] N82-33652

ION SOURCES
Negative-ion-beam generation with the ORNL SITEX source
[DE82-016042] N82-34211

IONIC COLLISIONS
Structures and fragmentation mechanics of the ions of ethanol by triple quadrupole mass spectrometry
[AD-A117442] N82-34200

IONIC REACTIONS
Auto-oxidation of sulphites
[NRC/CNR-TT-2023] N82-33465
Multi-ion interactions and defects in metals
[AD-A117451] N82-33502

IONIZATION
Microwave energy coupling in a nitrogen breakdown plasma
[AD-A117900] N82-34258

IONIZING RADIATION
Effects of ionization on silicate glasses
[DE82-012595] N82-33544
Structural changes in plasma membrane under influence of ionizing radiation N82-33993
Biological Effects of Nonionizing Electromagnetic Radiation: A digest of current literature, July through September 1981, volume 6, number 1
[PB82-176504] N82-34024

IONOSPHERE
Electron velocity shear instability in the auroral ionosphere
[AD-A116848] N82-33922
Lunar variation of several ionospheric parameters
[AD-A117689] N82-33938

IONOSPHERIC DISTURBANCES
Plasma wave turbulence and particle heating caused by electron beams, radiation and pinches
[AD-A117862] N82-34257

IONOSPHERIC F-SCATTER PROPAGATION
Techniques for Doppler spectral estimation of HF radar signals backscattered from high latitude ionosphere irregularities
[AD-A116838] N82-33613
Path integral formation of wave propagation in the ionosphere, 4
[AD-A117723] N82-33628
An atlas of ionospheric F-region structures as determined by the NRL-747/S3-4 ionospheric irregularities satellite investigation
[AD-A117269] N82-33923

IONS
Adaptive sampling for enhanced performance of an ion detection system for a triple quadupole mass spectrometer
[AD-A117441] N82-33471
Development of nitrogen sensor for determination of PN(2) in body tissues
[AD-A116607] N82-34005
Charge penetration effects in rare-earth crystal fields
[AD-A117494] N82-34283

IRON
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium
[AD-A117814] N82-33541
Study of the fundamental thermal-management aspects of the lithium-aluminium/iron sulfide battery
[DE82-014441] N82-33871
Diffraction and microscopy studies of the structure of grain boundaries in Fe, Fe-base alloys, and ceramic materials
[DE82-009553] N82-34287

IRON ALLOYS
Overlay metallic-cermet alloy coating systems --- for gas turbine engines
[NASA-CASE-LEW-13639-1] N82-33522
An example of the effect of hydrogen trapping on hydrogen embrittlement
[AD-A116299] N82-34106
Diffraction and microscopy studies of the structure of grain boundaries in Fe, Fe-base alloys, and ceramic materials
[DE82-009553] N82-34287

IRON COMPOUNDS
Ultraviolet enhanced deposition from pentacarbonyl-iron on gallium arsenide, quartz, and sapphire
[AD-A116800] N82-34278

IRRADIATION
Review of recent irradiation-creep results
[DE82-014570] N82-33512

IRREVERSIBLE PROCESSES
Optimal staging of endoreversible heat engines
[DE82-900742] N82-33841

IRRIGATION
Solar- and wind-powered irrigation systems
[PB82-177486] N82-33887

ISLANDS
The marine geology of the Bahama Escarpment N82-33916

ISOMERIZATION
High pressure NMR studies of the dynamic structure of liquids N82-33450

ISOSTATIC PRESSURE
Practical applications of hot-isostatic pressing diagrams: Four case studies
[PB82-182338] N82-33574

ISOTOPE SEPARATION
Research directed at developing a classical theory to describe isotope separation of polyatomic molecules illuminated by intense infrared radiation
[DE82-009652] N82-34208

ISOTROPIC MEDIA
Some vibrating membrane equations for the linear estimation of two dimensional isotropic random fields
[AD-A116959] N82-33770

ITERATION
Recent applications of the transonic wing analysis computer code, TWING
[NASA-TM-84283] N82-33346

ITERATIVE SOLUTION
An iterative phase-only nulling method
[AD-A116949] N82-33604

J

JACKETS
Flow phenomena in compressor casing treatment
[CUED/A-TURBO/TR-112] N82-33661

JAMMING
Measured performance of a delay lock tracking loop when noise power exceeds signal power
[AD-A116797] N82-33606

JET AIRCRAFT NOISE
Simulation of the fluctuating field of a forced jet
[NASA-TM-84506] N82-34191

JET ENGINE FUELS
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil, part 5
[AD-A117438] N82-33551
Hydrocarbon fuel chemistry: Sediment water interaction
[AD-A117928] N82-33552

JET ENGINES
The CF6 jet engine performance improvement: Low pressure turbine active clearance control
[NASA-CR-165557] N82-33393
Predictive model for jet engine test cell opacity
[AD-A117585] N82-33397
China's newly designed and built aircraft engine test stand
[AD-A117569] N82-33410
Diffuser/ejector system for a very high vacuum environment
[NASA-CASE-MFS-15791-1] N82-33712

JET FLOW
Simulation of the fluctuating field of a forced jet
[NASA-TM-84506] N82-34191

JET MIXING FLOW
The structure and growth of the mixing layer region of a round jet
[SU-TF-17] N82-33664

JOINING
Advanced joining technology
[AD-A117503] N82-33715

JOINTS (ANATOMY)
Dynamic response of vertebral elements response of the intervertebral joint to torsion
[AD-A115125] N82-34016

JOINTS (JUNCTIONS)
Design methodology for bonded-bolted composite joints. Volume 1: Analysis derivations and illustrative solutions
[AD-A117342] N82-33713
Optical rotary joint
[AD-A117025] N82-34226

JOSEPHSON JUNCTIONS
Superconductive niobium oxide tunnel device program
[AD-A117000] N82-33642

JP-4 JET FUEL
Vapor condensation control of JP-4 emissions from underground storage tanks at March Air Force Base, California
[AD-A117875] N82-33554

JUDGMENTS
A theory of diagnostic interference. 1: Imagination and the psychophysics of evidence
[AD-A115940] N82-34026
An analytical prediction of pilot ratings utilizing human pilot model N82-34051
Pilot opinions of sampling effects in lateral-directional control N82-34053

K

KINEMATICS
A mixed formulation finite element for linear thin shell analysis N82-33753

KINETIC THEORY
Electron velocity shear instability in the auroral ionosphere
[AD-A116848] N82-33922

KORTEWEG-DEVRIES EQUATION
Alternative representations of the inverse scattering transformation for the K-d V equation and the modified K-d equation
[IPPJ-581] N82-34248

L

LAMB WAVES
An analytical solution to the problems of 3-phonon interaction and second harmonic generation in a solid plate
[AD-A117907] N82-34195

LAMINAR FLOW
NASA research on viscous drag reduction
[NASA-TM-84518] N82-33344
Numerical analysis of hydraulically-driven fractures
[DE82-015501] N82-33939

LAMINATES
Application of In Situ Fiberization for fabrication of improved strain isolation pads and graphite epoxy composites
[NASA-CR-3616] N82-33431
Development of tough, moisture resistant laminating resins
[NASA-CR-3615] N82-33432
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N82-33436
Accelerated fatigue durability of a high performance composite
[NASA-CR-166407] N82-33437
Fracture mechanics of delamination: Initiation and growth
[AD-A115728] N82-33438
A fracture and ballistic penetration resistant laminate
[AD-A117142] N82-33439
Fatigue of laminated composite structures
[AD-A117731] N82-33443
LARC-TPI: A multi-purpose thermoplastic polyimide
[NASA-TM-84516] N82-33530
Development of effective machining and tooling techniques for Kevlar composite laminates
[AD-A117853] N82-33716
Improved damage tolerance of titanium by adhesive lamination
[NASA-TM-84525] N82-33737
Prediction of residual tensile strength of transversely impacted composite laminates N82-33745
Mechanics of bimodular composite structures
[AD-A117942] N82-33776

LAND USE
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813

LANDING
Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system
[AD-A117141] N82-33407

LAPLACE TRANSFORMATION
Preprocessing techniques in transient analysis
[AD-A116860] N82-34143

LARGE SPACE STRUCTURES
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-169419] N82-33422
The dynamics and control of large flexible space structures-V
[NASA-CR-169360] N82-33423

LARGE SPACE TELESCOPE
Analysis of space telescope data collection system
[NASA-CR-162090] N82-34322

LASER APPLICATIONS
Multiphoton ionization and fragmentation pathways of polyatomic molecules: Studies with a laser time-of-flight mass spectrometer N82-33457
Laser induced polymerization reactions in solid propellant binders
[AD-A117158] N82-33548
Resolution of contamination problems affecting laser surface certification inspection
[DE82-008775] N82-33711
Research directed at developing a classical theory to describe isotope separation of polyatomic molecules illuminated by intense infrared radiation
[DE82-009652] N82-34208

LASER DOPPLER VELOCIMETERS
Beta experiment flight report
[NASA-CR-170622] N82-33698
Beta experiment
[NASA-CR-162087] N82-33699

LASER OUTPUTS
Waveguide gas laser
[AD-A115648] N82-33701
Density measurement in air with saturable absorbing seed gas
[NASA-CR-169420] N82-33919

LASER PLASMAS
Study of laser heated propulsion devices. Part 1: Evaluation of laser devices, fuels and energy coupling mechanisms
[NASA-CR-170625] N82-33696

LASER PROPULSION
Study of laser heated propulsion devices. Part 1: Evaluation of laser devices, fuels and energy coupling mechanisms
[NASA-CR-170625] N82-33696
Study of laser heated propulsion devices. Part 2: Assessment of laser propulsion modeling and simulation requirements
[NASA-CR-170626] N82-33697

LASER PUMPING
Continuously-tunable high-repetition rate RF-excited CO2 waveguide laser
[NDRC/PUBL-82/1002] N82-33695

LASER SPECTROMETERS
Multiphoton ionization and fragmentation pathways of polyatomic molecules: Studies with a laser time-of-flight mass spectrometer N82-33457

LASER TARGET DESIGNATORS
Active imaging of range targets at 1.2 millimeters
[AD-A117161] N82-33611

LASER WEAPONS
Attenuation of high intensity reradiated light by photochromic glass
[AD-A117424] N82-34227

LASER WELDING
Microstructural analysis of austenitic stainless steel welds and their modification during laser welding
[DE82-016036] N82-33515

LASERS
Electron beam generated holographic optical element research
[AD-A117052] N82-33685
Advanced joining technology
[AD-A117503] N82-33715
Density measurement in air with saturable absorbing seed gas
[NASA-CR-169420] N82-33919

LATERAL STABILITY
Curved flow wind tunnnel test of F-18 aircraft
[NASA-CR-169345] N82-33339

Visual/motion cue mismatch during a coordinated roll maneuver N82-34055

LATEX
Compressibility of colloids. 1: Compressibility studies of aqueous solutions of amphibilic polymers and their adsorbed state on Polystyrne latex dispersions by ultrasonic velocity measurements
[AD-A117416] N82-33538

LATTICES (MATHEMATICS)
Efficient multichannel autoregressive modeling in time and frequency domain
[AD-A115752] N82-34139

LAUNCH VEHICLES
Aeronautical knowledge (selected articles)
[AD-A115649] N82-33335

LAUNCHING
Alternative employment concepts for Remotely Piloted Vehicle (RPV) FLIR/TV mission payload
[AD-A117877] N82-33379

LAW (JURISPRUDENCE)
Coastal construction practices
[PB82-201062] N82-33591

LEACHING
Solvent extraction of nickel and copper from laterite-ammoniacal leach liquors
[PB82-176587] N82-33518

LEAD (METAL)
Part 1: Ancient arctic ice does not contain large excesses of natural lead. Part 2: Chronological variations in lead and barium concentrations and lead isotopic compositions in sediments of four southern California off-shore basins N82-33791

LEADING EDGES
User's manual for interfacing a leading edge, vortex rollup program with two linear panel methods
[NASA-TM-78504] N82-33340

LEAST SQUARES METHOD
On the adaptive implementation of Pisarenko's harmonic retrieval method
[AD-A116003] N82-33600

LENSES
Optical rotary joint
[AD-A117025] N82-34226

LEPTONS
Inelastic strong interactions at high energies
[DE82-007984] N82-34215

LEVEL
Interruptible supersaturated two-level designs
[AD-A115786] N82-34181

LEVELING
Pavement thickness, surface evenness and construction practice
[PB82-202590] N82-33586

LEVITATION
Ultimate intrinsic coercivity samarian-cobalt magnet. An Earth based feasibility study for Space Shuttle missions
[NASA-CR-170627] N82-33495
Sphere forming method and apparatus
[NASA-CASE-NPO-15070-1] N82-33567

LIFE (DURABILITY)
Probabilistic environmental model for solid rocket motor life prediction
[AD-A117651] N82-33427
Nickel-zinc batteries for RPV applications
[AD-A115843] N82-33832

LIFE SUPPORT SYSTEMS
Air pollutant production by algal cell cultures
[NASA-CR-166384] N82-34076
Application of control theory to dynamic systems simulation
[NASA-CR-166383] N82-34077

LIFT DEVICES
Lift system and fan performance of air cushion supported vehicles
[AD-A117363] N82-33570

LIFT DRAG RATIO
An experimental study of the transonic equivalence rule with lift
[AD-A117019] N82-33350

LIFT FANS
Lift system and fan performance of air cushion supported vehicles
[AD-A117363] N82-33570

LIGANDS
Charge penetration effects in rare-earth crystal fields
[AD-A117494] N82-34283

LIGHT (VISIBLE RADIATION)
Attenuation of high intensity reradiated light by photochromic glass
[AD-A117424] N82-34227

LIGHT BEAMS
Micom program in light control by light
[AD-A117159] N82-33706

LIGHT MODULATION
Time-frequency and space-frequency characteristics of optical modulators
[AD-A115650] N82-34221

LIGHT SCATTERING
Photoacoustic spectroscopy at visible and infrared wavelengths N82-33448
Calculation on optical effect of matter from first principles using group theoretical techniques
[AD-A117310] N82-34223
Light scattering calculations for the nephelometer experiment on the 1981/1982 Jupiter Orbiter-Probe mission
[NASA-CR-169418] N82-34323

LIGHT TRANSMISSION
Factors relating surface visibility to the total optical depth in the marine regime
[AD-A117836] N82-34232

LIGHTING EQUIPMENT
Examination of aircraft interior emergency lighting in a postcrash fire environment
[AD-A117629] N82-33360

LIMITERS (FUSION REACTORS)
All coated limited experiment in the JIPP T-II Tokamak
[IPPJ-593] N82-34241

LIMITS (MATHEMATICS)
Central limit theorems in the area of large deviations for some dependent random variables
[AD-A117714] N82-34155

LINE SPECTRA
The structure, energy balance, and winds of cool stars
[NASA-CR-169356] N82-34318

LINEAR ARRAYS
An iterative phase-only nulling method
[AD-A116949] N82-33604

LINEAR FILTERS
Stochastic and adaptive systems
[AD-A117029] N82-34182

LINEAR INTEGRATED CIRCUITS
Automatic test methods for linear microcircuits
[AD-A117594] N82-33649

LINEAR PREDICTION
Effects of motivation on car-following N82-34070
Edgeworth expansions in statistics: A brief review
[AD-A117061] N82-34165

LINEAR PROGRAMMING
The strength of surrogate constraints for the linear zero-one integer programming problem
[AD-A115736] N82-34137

LINEAR TRANSFORMATIONS
Preprocessing techniques in transient analysis
[AD-A116860] N82-34143

LININGS
Nonlinear constitutive theory for turbine engine structural analysis N82-33744
Circumferentially segmented duct lines optimized for axisymmetric and standing wave sources --- reducing noise from turbofan engines galerkin method acoustic attenuation
[NASA-TP-2075] N82-34190

LIQUEFACTION
Evaluation of techniques for predicting soil liquefaction and verification of field techniques to predict in situ shear wave velocity
[PB82-168444] N82-33581

LIQUID ATOMIZATION
Atomization characteristics of coal-water mixtures
[DE82-009093] N82-33477

LIQUID CHROMATOGRAPHY
Studies in on-line reversed phase liquid chromatography/mass spectrometry N82-33452
Research and development services: Methods development
[AD-A117643] N82-34302

LIQUID PROPELLANT ROCKET ENGINES
The analysis for regulation performance of a variable thrust rocket engine control system
[AD-A117495] N82-33429

LIQUID WASTES
Sampling of liquid effluents from refineries
[PB82-174657] N82-33906

LIQUID-VAPOR EQUILIBRIUM
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A117080] N82-33549

LIQUIDS
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354

LISP (PROGRAMMING LANGUAGE)
Nonalgebraic symbol manipulators for use in scientific and engineering modeling: Introducing the FORSE (FORTRAN Symbol Expander)
[DE82-009818] N82-34118

LITERATURE
The literature of vibration engineering N82-33562

LITHIUM
Properties of SOC12 electrolyte solutions
[AD-A117306] N82-33834

LITHIUM CHLORIDES
Compatibility of polyacetylene with lithium battery materials
[AD-A117684] N82-33837

LITHIUM COMPOUNDS
Magnetic properties of lithium ferrite microwave materials
[AD-A116907] N82-34184

LITHIUM HYDRIDES
Molten phosphate electrolyte for the electrolysis of water
[DE82-008211] N82-33482

LITHIUM SULFUR BATTERIES
Study of the fundamental thermal-management aspects of the lithium-aluminium/iron sulfide battery
[DE82-014441] N82-33871

LITHOGRAPHY
Electron beam generated holographic optical element research
[AD-A117052] N82-33685

LOAD DISTRIBUTION (FORCES)
Susceptibility of symmetric structures to nonlinear torsional coupling N82-33759

LOAD TESTING MACHINES
Explosive-powder compaction system
[DE82-003134] N82-33556

LOADS (FORCES)
Nonlinear analysis of rectangular glass plates by finite difference methods
[PB82-172552] N82-33547
Snowpack profile analysis using extracted thin sections
[AD-A117839] N82-33957

LOGIC CIRCUITS
An architecture for database management standards
[PB82-176322] N82-34099

LOGISTICS
Palm's theorem for nonstationary processes
[AD-A117089] N82-34135

LOGISTICS MANAGEMENT
Scheduling maintenance operations which cause age-dependant failure rate changes
[AD-A117267] N82-34293

LONG TERM EFFECTS
The geologic record of climatic change
[NASA-TM-83956] N82-33946

LONGITUDINAL STABILITY
A ground-simulator investigation of helicopter longitudinal flying qualities for instrument approach
[NASA-TM-84225] N82-33398

LOW ASPECT RATIO WINGS
Recent applications of the transonic wing analysis computer code, TWING
[NASA-TM-84283] N82-33346

LOW PASS FILTERS
Responses of FM/CW systems having filters
[AD-A117371] N82-33617

LOW PRESSURE
The CF6 jet engine performance improvement: Low pressure turbine active clearance control
[NASA-CR-165557] N82-33393
Energy efficient engine: Turbine transition duct model technology report
[NASA-CR-167996] N82-33394

LUBRICATING OILS
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N82-33526
Guidelines for the determination of atmospheric conditions of oil mists
[PB82-174251] N82-33908

LUBRICATION
Thermal effects in rolling/sliding contact
[AD-A117702] N82-33719

LUGS
Fatigue behaviour of advanced structural aluminium alloy 74575-T761 --- for aircraft construction
[TAE-447] N82-33492

LUMINOUS INTENSITY
Photoacoustic spectroscopy at visible and infrared wavelengths N82-33448

LUNAR TIDES
Lunar variation of several ionospheric parameters
[AD-A117689] N82-33938

M

MACHINING
Development of effective machining and tooling techniques for Kevlar composite laminates
[AD-A117853] N82-33716

Computer-aided design, drawing and manufacturing system for dies and molds
[NRC/CNR-TT-2030] N82-34101

MAGMA
Geology and evolution of the magmatic rocks of the Vourinos Ophiolite, northern Greece N82-33914

MAGNESIUM ALLOYS
Thermal fatigue behavior of FP alumina/magnesium composites
[AD-A117292] N82-33440

MAGNET COILS
Superconducting Magnetic Energy Storage (SMES) Program
[DE82-009083] N82-33848

MAGNETIC ANOMALIES
Aeromagnetic detection and definition of seamounts
[AD-A117153] N82-33971

MAGNETIC COILS
Helical magnetic configurations produced with the help of ferromagnetic materials. 2: The Helimag
[IPPJ-591] N82-34243
High energy tail production by higher harmonic frequency up to 5 omega ci
[AD-B067129] N82-34250

MAGNETIC FIELD CONFIGURATIONS
Helical magnetic configurations produced with the help of ferromagnetic materials. 2: The Helimag
[IPPJ-591] N82-34243
Low-frequency turbulence, particle and heat transport in the Wisconsin levitated octupole
[DE82-012557] N82-34263

MAGNETIC FIELDS
The effects of transverse gradient of static magnetic wigglers on the free electron laser
[AD-A116968] N82-33704
Magnetostratigraphy and magnetic properties of the Pliocene Glenns Ferry formation of southwest Idaho N82-33913
Effect of magnetic shear on the electrostatic ion cyclotron waves in magnetospheric plasmas
[NASA-CR-169229] N82-34183
Inter-subband optical absorption in an inverse layer on a semiconductor surface in tilted magnetic fields
[DE82-011591] N82-34185
Formation of magnetic islands and ergodic magnetic layers in wall-lapping plasma as a non-divertor concept for a reactor-relevant Tokamak
[IPPJ-587] N82-34238
Structure of field rotating disturbances in warm plasma
[NASA-CR-169359] N82-34256

MAGNETIC FLUX
Formation of relativistic electron beam rings in a conducting cavity
[IPPJ-583] N82-34237

MAGNETIC MIRRORS
Self-consistent analysis of collisional loss in a spatially varying magnetic mirror
[IPPJ-588] N82-34245

MAGNETIC PROPERTIES
An analytical investigation of fin lines with magnetized ferrite substrate
[AD-A117504] N82-33624
Magnetostratigraphy and magnetic properties of the Pliocene Glenns Ferry formation of southwest Idaho N82-33913
Magnetic properties of lithium ferrite microwave materials
[AD-A116907] N82-34184

MAGNETIC STORAGE
A program of research on microfabrication techniques for VLSI magnetic devices
[AD-A117922] N82-34281

MAGNETIC SURVEYS
Airborne gamma-ray spectrometer and magnetometer survey: Alturas Quadrangle, California
[DE82-005539] N82-33805
Aeromagnetic detection and definition of seamounts
[AD-A117153] N82-33971

MAGNETIC SUSPENSION
Design concepts and cost studies for magnetic suspension and balance systems --- wind tunnel apparatus
[NASA-CR-165917] N82-33404

MAGNETO-OPTICS
Inter-subband optical absorption in an inverse layer on a semiconductor surface in tilted magnetic fields
[DE82-011591] N82-34185

MAGNETOHYDRODYNAMIC GENERATORS
Development of materials for open cycle MHD
[DE82-008777] N82-34261

MAGNETOHYDRODYNAMIC STABILITY
Effects of ion-bounce resonances on ballooning-interchange modes
[DE82-014405] N82-34268

MAGNETOHYDRODYNAMICS
System study of an MHD/gas turbine combined-cycle baseload power plant
[DE82-015215] N82-33869

MAGNETOMETERS
Research support for plasma diagnostics on Elmo Bumpy diamagnetic measurements for the electron rings and development of a ferromagnetic resonance magnetometer
[DE82-007245] N82-34259

MAGNETOSPHERE
Detection of nonthermal continuum radiation in Saturn's magnetosphere
[NASA-CR-169231] N82-34326

MAGNETS
Ultimate intrinsic coercivity samarian-cobalt magnet. An Earth based feasibility study for Space Shuttle missions
[NASA-CR-170627] N82-33495

MAGNUS EFFECT
Computations of projectile Magnus effect at transonic velocities
[AD-A117313] N82-33353

MAIN SEQUENCE STARS
Identification of the emission features near 3.5 microns in the pre main sequence star HD 97048
[NASA-CR-169379] N82-34320

MAINTAINABILITY
Reliability, Availability, Maintainability Data Tracking Plan improved GUARDRAIL 5
[AD-A117933] N82-33378
Stochastic availability of a repairable system with an age and maintenance dependent failure rate
[AD-A116932] N82-34294

MAINTENANCE
Age dependent minimal repair
[AD-A116846] N82-33336
Method for repair of thin glass coatings --- on space shuttle orbiter tiles
[NASA-CASE-KSC-11097-1] N82-33520
Polymer concrete and its application to bridge deck maintenance
[PB82-177940] N82-33579
Design of overlays based on pavement condition, roughness, and deflections
[PB82-201369] N82-33588
Scheduling maintenance operations which cause age-dependant failure rate changes
[AD-A117267] N82-34293
Stochastic availability of a repairable system with an age and maintenance dependent failure rate
[AD-A116932] N82-34294

MAN MACHINE SYSTEMS
Voice Interactive Systems Technology Avionics (VISTA) Program
[AD-A117288] N82-33383
The effect of visual information on the manual approach and landing N82-34041
Parametric identification of human operator models N82-34045
Supervision of dynamic systems: Monitoring, decision-making and control N82-34069
Experimental evaluation of the concept of supevisory manipulation N82-34073
Evaluation of SMART sensor displays for multidimensional precision control of Space Shuttle remote manipulator N82-34074
The DMS multiprocess execution environment
[AD-A117660] N82-34096
Computer graphic representation of remote environment using position tactile sensors
[AD-A116912] N82-34111
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 3: ARAMIS overview
[NASA-CR-162081] N82-34128
Information display systems. Summary of project status
[DE82-009971] N82-34304

MANAGEMENT
Human capital adjustments to technological change in the computer industry: The case of scientists and engineers
[PB82-180969] N82-34036

MANAGEMENT INFORMATION SYSTEMS
MISIL, too big to fly
[AD-A117940] N82-34303

MANAGEMENT METHODS
An assessment of PERT as a technique for schedule planning and control
[NASA-TM-83265] N82-33981
Basic techniques in availability engineering
[DE82-903666] N82-34298

MANAGEMENT PLANNING
Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs and improve readiness
[AD-A117935] N82-34296
Major science and technology issues
[PAD-81-35] N82-34310

MANAGEMENT SYSTEMS
Design of automated systems for control of technological processes in large scale microbiological industry with use of microprocesors N82-33990

MANEUVERS
Optical flow and texture variables useful in simulating self motion
[AD-A117016] N82-34081

MANGANESE
The interaction of manganese(II) with the surface of calcite in dilute solutions and seawater
[DE82-011104] N82-33475

MANIPULATORS
Computer graphic representation of remote environment using position tactile sensors
[AD-A116912] N82-34111

MANNED SPACECRAFT
Private financing and operation of a space station: Investment requirements, risk, government support and other primary business management considerations
[NASA-CR-169357] N82-34291

MANUAL CONTROL
Sixteenth Annual Conference on Manual Control
[NASA-TM-84273] N82-34037
Modeling of human operator dynamics in simple manual control utilizing time series analysis --- tracking (position) N82-34038
A gunner model for an AAA tracking task with interrupted observations N82-34039
Modeling human target acquisition in ground-to-air weapon systems N82-34040
The effect of visual information on the manual approach and landing N82-34041
The effects of multiplicative motor noise on the optimal human operator model N82-34042
Training aircraft design considerations based on the successive organization of perception in manual control N82-34043
An experimental study of human pilot's scanning behavior N82-34044
Parametric identification of human operator models N82-34045
A computer simulation approach to measurement of human control strategy N82-34046
An analytical prediction of pilot ratings utilizing human pilot model N82-34051
Description/demonstration of BIODYN-80. A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limbs, head and eyes N82-34057
Levels of steering control: Reproduction of steering-wheel movements N82-34071
Experimental evaluation of the concept of supevisory manipulation N82-34073

MANUFACTURING
The effects of processing conditions on the reliability of cross-linked polyethylene cable insulation
[DE82-011712] N82-33543
Glass batch preheater: Phase 2. Laboratory testing
[PB82-180639] N82-33577

MAPPING
Applying photogrammetry to real time collection of digital image data
[AD-A116770] N82-33687
Cartographic mapping study
[NASA-CR-170446] N82-33795
An analysis of the max-min texture measure
[AD-A116768] N82-33799
The roughness lengths associated with regions of heterogeneous vegetation and elevation
[AD-A117409] N82-33802
Measuring the fracture dimensions of empirical cartographic curves
[AD-A117498] N82-33804

MARINE METEOROLOGY
Marine atmospheric boundary layer and inversion forecast model
[AD-A115769] N82-33949

MARITIME SATELLITES
INTELSAT V-E(F-5)
[NASA-TM-84857] N82-33413

MARKERS
Testing of tritium-powered runway distance and taxiway markers
[AD-A114558] N82-33408

MARKETING
An assessment of the field status of active solar systems
[DE82-011939] N82-33845

The Montana Energy and MHD Development Institute, Inc.
[PB82-176926] N82-33885

MARTENSITE
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501

MASS SPECTROMETERS
Adaptive sampling for enhanced performance of an ion detection system for a triple quadupole mass spectrometer
[AD-A117441] N82-33471

MASS SPECTROSCOPY
Studies in on-line reversed phase liquid chromatography/mass spectrometry N82-33452
New viewpoints in mass filter design
[AD-A117295] N82-33468
Determination of carbon monoxide in air by triple quadrupole mass spectrometry
[AD-A117443] N82-33470
Characterization of coal-derived liquids and other fossil-fuel-related materials employing mass spectrometry
[DE82-015005] N82-33558
Structures and fragmentation mechanics of the ions of ethanol by triple quadrupole mass spectrometry
[AD-A117442] N82-34200

MASS TRANSFER
Solvent Refined Coal (SRC) Process. Effect of mixing energy on hydrogen reaction rates in SRC-11 reactors
[DE82-008447] N82-33481
Mechanisms affecting mass transfer in fuel cells
[DE82-013431] N82-33876

MATCHED FILTERS
Photonic seeker development
[AD-A117160] N82-34225

MATERIALS HANDLING
The 26th AFOSR chemical and atmospheric sciences program review FY81
[AD-A117325] N82-33930

MATHEMATICAL LOGIC
Extrapolation algorithms and their use for the evaluation of beam-beam effects on the motion and polarization of particles in storage rings
[DE82-011425] N82-34203

MATHEMATICAL MODELS
Age dependent minimal repair
[AD-A116846] N82-33336
Dayton aircraft cabin fire model, version 3. Volume 1: Physical description
[AD-A117905] N82-33361
Universal turret system model determination and controller performance testing
[AD-A117687] N82-33380
Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system
[AD-A117141] N82-33407
Modelling of deformation and fracture in high-temperature structural materials
[DE82-013040] N82-33511
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil, part 5
[AD-A117438] N82-33551
A two-component rain model for the prediction of attenuation and diversity improvement
[NASA-CR-169198] N82-33592
Path integral formation of wave propagation in the ionosphere, 4
[AD-A117723] N82-33628
Approximate theory for the transverse motion of a two-layered plate. A theoretical model applicable to acoustic scattering from submerged structures with coating layer(s)
[AD-A117034] N82-33767
Flow characteristics in geopressured zones and salt water agulfers
[PB82-181280] N82-33807
Energy laboratory data and model directory
[PB82-180274] N82-33884
Marine atmospheric boundary layer and inversion forecast model
[AD-A115769] N82-33949
Modeling lateral acceleration effects on pilot performance N82-34058
A comprehensive system model for motion/space sickness. Preliminary results N82-34059
Combined discrete network. Continuous control modelling of operator behavior N82-34064
A model of human decision making in multiple process monitoring situations N82-34065
PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066
Octree generation, analysis and manipulation
[AD-A117450] N82-34112
Nonalgebraic symbol manipulators for use in scientific and engineering modeling: Introducing the FORSE (FORTRAN Symbol Expander)
[DE82-009818] N82-34118
A note on COPE: A software tool for modeling and evaluating the performance of computing systems
[FUB-7-1982] N82-34119
Palm's theorem for nonstationary processes
[AD-A117089] N82-34135
A Toeplitz Gram-Schmidt algorithm for autoregressive modeling
[AD-A117071] N82-34145
Spectral equivalence of deterministic and stochastic models for time series with a periodic component
[AD-A117718] N82-34179
On the current status of theoretical modeling of acoustic waves in saturated sediments
[AD-A117847] N82-34194
High energy hadron-hadron collisions
[DE82-011255] N82-34206
Average beta value of axially symmetric plasma
[IPPJ-586] N82-34252
Simplified scaling model for the THETA-pinch
[DE82-009962] N82-34273

MATRICES (MATHEMATICS)
Vectorized sparse elimination
[AD-A117112] N82-34094
A Toeplitz Gram-Schmidt algorithm for autoregressive modeling
[AD-A117071] N82-34145
Structure and Smith-MacMillan form of a rational matrix at infinity
[PB82-178625] N82-34159

MATRIX MATERIALS
Composite structural materials
[NASA-CR-169345] N82-33434

MATRIX METHODS
A computer package for the design and eigenproblem solution of damped linear multidegree of freedom systems N82-33764

MAXIMUM ENTROPY METHOD
Quantiles, parametric-select density estimations, and bi-information parameter estimators
[AD-A117460] N82-34153
Maximum entropy interpretation of autoregressive spectral densities
[AD-A117263] N82-34175

MAXIMUM LIKELIHOOD ESTIMATES
Method of moments estimators for the moving average coefficients in an ARMA (p,q) process
[AD-A116943] N82-34171

MEAN
NOMBAS: A Bayesian procedure for selecting the greatest mean
[AD-A117611] N82-34178

MEANDERS
Oceanic frontal stability: A numerical model
[AD-A115519] N82-33976

MEASURE AND INTEGRATION
Integration of multidimensional regions with applications to finite element analysis N82-33750

MEASURING INSTRUMENTS
Pavement roughness evaluations using a Mays Ride Meter
[PB82-177841] N82-33580
Integrated systems of automatic radio equipment
[AD-A115670] N82-33602
BLEST impulse time-of-flight sphere
[AD-A116940] N82-33686
Performance evaluation of RF electric and magnetic field measuring instruments
[PB82-195009] N82-33694
Methods and techniques of experimental research on the atmosphere (selected articles)
[AD-A117570] N82-33933
Study of the source function by the causality methods defined by Ribner and Siddon
[PB82-205170] N82-34196

MECHANICAL DEVICES
A new analysis of the unwinding ribbon as a delayed arming device
[AD-A117352] N82-33571

MECHANICAL DRIVES
Automotive Stirling Engine Mod 1 Design Review, volume 3 --- engineering drawings
[NASA-CR-167397] N82-34312

MECHANICAL ENGINEERING
The literature of vibration engineering N82-33562

MECHANICAL PROPERTIES
Mechanical properties of E293/1581 fiberglass-epoxy composite and several adhesive systems
[AD-A117902] N82-33442
Blended elemental titanium alloys
[DE82-012882] N82-33513
Rapid quenching effects in PVC films
[NASA-CR-169350] N82-33524
Dynamic mechanical analysis and organization/storage of data for polymetric materials
[NASA-CR-166413] N82-33527
The Catskill-Cairo experimental rigid pavement: A ten-year progress report
[PB82-201229] N82-33589
Nondestructive method for determining fatigue and stress-corrosion damage
[AD-A117631] N82-33774

MECHANICAL SHOCK
The Shock and Vibration Digest, volume 13, no. 11
[AD-A108209] N82-34336

MEDICAL SCIENCE
USSR Report: Life sciences. Biomedical and behavioral sciences
[JPRS-81775] N82-33988

MELTING
Method of evaluating the thermal stability of the pyroelectric properties of polyvinylidene fluoride effects of poling temperature and field
[AD-A117388] N82-33536
A general climatological guide to daily freezing conditions: Frost days, ice days and freeze-thaw days
[AD-A116771] N82-33952

MELTING POINTS
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354

MELTS (CRYSTAL GROWTH)
Finite element modeling of nonisothermal polymer flows
[NASA-CR-169355] N82-33525

MEMBRANE STRUCTURES
Voltammetric studies of a multipurpose membrane electrode N82-33455
Some vibrating membrane equations for the linear estimation of two dimensional isotropic random fields
[AD-A116959] N82-33770

MEMBRANES
Viscosity dependence of the rates of diffusional processes
[NASA-CR-166394] N82-33982
Structural changes in plasma membrane under influence of ionizing radiation N82-33993

MEMORY
Structures of memory for critical flight information
[AD-A116510] N82-34028

MENTAL PERFORMANCE
On the modelling of creative behavior
[AD-A116896] N82-34027
Subjective scaling of mental workload in a multi-task environment N82-34048
A performance analysis study of a complex G field experiment N82-34056

MERCURY CADMIUM TELLURIDES
Mercury cadmium telluride sputtered target research
[AD-A117456] N82-33572

MESONS
Versatile secondary beam for the meson area
[DE82-014275] N82-34209

MESSAGE PROCESSING
Distributed minimum hop algorithms
[AD-A117808] N82-34151

METAL COATINGS
Fundamental research directed to advanced high temperature coating systems beyond the current state-of-the-art systems
[AD-A117845] N82-33504

METAL FATIGUE
Fracture and fatigue characteristics in titanium alloys
[AD-A117155] N82-33499
Stress corrosion characterization of turbine rotor materials, phase 1
[DE82-902070] N82-33508
Modelling of deformation and fracture in high-temperature structural materials
[DE82-013040] N82-33511
The fatigue notch factor revisited
[TAE-446] N82-33732
An example of the effect of hydrogen trapping on hydrogen embrittlement
[AD-A116299] N82-34106

METAL OXIDE SEMICONDUCTORS
Inter-subband optical absorption in an inverse layer on a semiconductor surface in tilted magnetic fields
[DE82-011591] N82-34185

METAL OXIDES
Metal alkoxides: Models for metal oxides
[AD-A117947] N82-33503

METAL PLATES
Longitudinal shrinkage of eccentric single-pass welds
[PB82-174731] N82-33720

Approximate theory for the transverse motion of a two-layered plate. A theoretical model applicable to acoustic scattering from submerged structures with coating layer(s)
[AD-A117034] N82-33767

METAL POWDER
Mercury cadmium telluride sputtered target research
[AD-A117456] N82-33572

METAL SHEETS
A fracture and ballistic penetration resistant laminate
[AD-A117142] N82-33439

METAL SURFACES
A study of the nature of solid particle impact and shape on the erosion morphology of ductile metals
[NASA-TM-82933] N82-33493
Overlay metallic-cermet alloy coating systems --- for gas turbine engines
[NASA-CASE-LEW-13639-1] N82-33522

METALLIZING
High-aspect-ratio silicon-cell metallization
[DE82-011687] N82-33861

METALS
Strength diagrams of fibrous composites with unidirectional structure
[NASA-TM-76975] N82-33433
Multi-ion interactions and defects in metals
[AD-A117451] N82-33502
Review of recent irradiation-creep results
[DE82-014570] N82-33512
Advanced joining technology
[AD-A117503] N82-33715

METASTABLE STATE
Research on sources of gas phase metastable atoms and molecules
[AD-A117672] N82-34201
Determination of metastable fraction in an ion beam extracted from ECR plasma
[IPPJ-580] N82-34236

METEOROLOGICAL CHARTS
The role of meteorological satellites in tactical battlefield weather support
[AD-A116936] N82-33950

METEOROLOGICAL INSTRUMENTS
TMA chemical release payloads for stratospheric wind measurements auroral E program and related programs
[AD-A115832] N82-33921
Automated Low-cost Weather Observation System (ALWOS)
[AD-A117447] N82-33954

METEOROLOGICAL PARAMETERS
Evaporation in Relation to Hydrology
[PB82-176108] N82-33814
Overview of the aerothermal environment of air-launched missiles
[AD-A116799] N82-33924
Methods and techniques of experimental research on the atmosphere (selected articles)
[AD-A117570] N82-33933

METEOROLOGICAL SATELLITES
The role of meteorological satellites in tactical battlefield weather support
[AD-A116936] N82-33950

METEOROLOGY
The 26th AFOSR chemical and atmospheric sciences program review FY81
[AD-A117325] N82-33930

METHOD OF MOMENTS
Method of moments estimators for the moving average coefficients in an ARMA (p,q) process
[AD-A116943] N82-34171

METHYL ALCOHOLS
Conversion of ammonia plants to methanol production
[PB82-177494] N82-33489
Feasibility study for a coal-sourced methanol project
[DE82-008137] N82-33559

METHYL COMPOUNDS
Raman studies of reorientational and vibrational relaxation in dense fluids N82-33456

METRICATION
Metric conversion in the United States N82-33568

MICROBIOLOGY
USSR Report: Life sciences. Biomedical and behavioral sciences
[JPRS-81775] N82-33988
Design of automated systems for control of technological processes in large scale microbiological industry with use of microprocesors N82-33990

MICROCOMPUTERS
Real-time control of GMA welding
[PB82-204660] N82-33721
GMA welding experiments using real-time control
[PB82-204652] N82-33722
Applications of artificial intelligence in voice recognition systems in micro-computers
[AD-A115735] N82-34132

MICROELECTRONICS
Method for sequentially processing a multi-level interconnect circuit in a vacuum chamber
[NASA-CASE-MFS-15670-1] N82-33634
Automatic test methods for linear microcircuits
[AD-A117594] N82-33649
Glass-to-metal seal quality
[AD-A117598] N82-33718

MICROPROCESSORS
Environmental data for sites in the national solar data network
[DE82-008076] N82-33959
Design of automated systems for control of technological processes in large scale microbiological industry with use of microprocesors N82-33990
Improved microprocessor design
[AD-A110858] N82-34088

MICROSTRIP TRANSMISSION LINES
A FORTRAN program for rectangular microstrip antennas
[AD-A116952] N82-33612
Design of microstrip linear array antennas by computer
[AD-A117399] N82-33620

MICROSTRUCTURE
Microstructural analysis of austenitic stainless steel welds and their modification during laser welding
[DE82-016036] N82-33515

MICROWAVE COUPLING
Microwave energy coupling in a nitrogen breakdown plasma
[AD-A117900] N82-34258

MICROWAVE IMAGERY
Active microwave remote sensing research program plan. Recommendations of the Earth Resources Synthetic Aperture Radar Task Force --- application areas: vegetation canopies, surface water, surface morphology, rocks and soils, and man-made structures
[NASA-CR-167726] N82-33596

MICROWAVE SENSORS
NORSEX 1979 microwave remote sensing data report
[NASA-CR-165967] N82-33796

MICROWAVE SPECTROMETERS
Measurement of tropospheric carbonyl sulfide by microwave spectrometry
[NASA-CR-169417] N82-33920

MICROWAVE TRANSMISSION
MSTRIP2: Parameters of microstrip transmission lines and of coupled pairs of lines. 1978 version and its application
[AD-A117364] N82-33615

MICROWAVE TUBES
A novel beam bunching concept for millimeter wave tubes
[AD-A117107] N82-33608

MICROWAVES
Experimental and theoretical investigation of microwave and millimeter wave radiation from hollow, rotating, electron beams
[AD-A117896] N82-33625
Dosimetric and behavioral analysis of microwave-drug synergistic effects on operant behavior in the rat
[AD-A115115] N82-33986
Magnetic properties of lithium ferrite microwave materials
[AD-A116907] N82-34184

MILITARY AIRCRAFT
Study of the frequency assignment congestion in the ultra high frequency air traffic control air/ground communication band
[AD-A117640] N82-33368
A systems approach for crew station design and evaluation
[AD-A115663] N82-34080

MILITARY OPERATIONS
Survey and update of F-14A mission profiles for TF30 engine usage
[AD-A116831] N82-33337
Nickel-zinc batteries for RPV applications
[AD-A115843] N82-33832
The role of meteorological satellites in tactical battlefield weather support
[AD-A116936] N82-33950
NATO glossary of terms and definitions (English and French)
[AD-A117715] N82-34290

MILITARY TECHNOLOGY
An assessment of the impact of the Department of Defense very high speed integrated circuit program
[AD-A117459] N82-33646
Properties of SOC12 electrolyte solutions
[AD-A117306] N82-33834
Analysis of NASA's fiscal year 1983 budget request for research and development to determine the amount that supports DOD's programs
[B-207165] N82-34307
The Department of Defense statement on the science and technology program by Mr. H. Mark Grove, Assistant Deputy Under Secretary of Defense for Research and Advanced Technology before the Defense Subcommittee of the Committee on Appropriations of the United States House of Representatives, 97th Congress, second session
[AD-A116788] N82-34339
USAF Summer Faculty Research Program. Volume 1: 1981 research reports
[AD-A113708] N82-34340
USAF Summer Faculty Research Program. Volume 2: 1981 research reports
[AD-A113709] N82-34341

MILLIMETER WAVES
A novel beam bunching concept for millimeter wave tubes
[AD-A117107] N82-33608
Effect of ground terrain on millimeter wave propagation
[AD-A116837] N82-33614
Experimental and theoretical investigation of microwave and millimeter wave radiation from hollow, rotating, electron beams
[AD-A117896] N82-33625
Near millimeter wave radiation from a gyromonotron
[AD-A117301] N82-33703

MILLING MACHINES
Design description of the Tangaye Village photovoltaic power system
[NASA-TM-82917] N82-33828

MINERAL DEPOSITS
A primer on sulfur for the planetary geologist
[NASA-CR-3594] N82-33459
Assessment of underground coal gasification in bituminous coals. Volume 1: Executive summary
[DE82-014584] N82-33557
Overseas Geology and Mineral Resources, number 55. Outline of the geology of Ecuador
[PB82-172784] N82-33815
Preliminary study of in-situ combustion in diatomites
[DE82-013272] N82-33862

MINERAL EXPLORATION
Airborne gamma-ray spectrometer and magnetometer survey: Alturas Quadrangle, California
[DE82-005539] N82-33805
Grand Junction Area Office, United States Department of Energy 1980/1981 activities report
[DE82-009638] N82-33806

MINERALS
Applicability of factor analysis to the determination of mineral matter in coal N82-33790
World mineral statistics 1975-79: Production, exports, imports
[PB82-172842] N82-33811
United Kingdom mineral statistics 1980
[PB82-172362] N82-33817
Technology assessment of solar-energy systems. Part 1: An analysis of life-cycle costs of solar facilities. Part 2: Minerals critical to the development of future energy technologies in high and low solar scenarios
[DE82-012339] N82-33852

MINES
Monitoring of submicrometer particles in sealed fire areas
[PB82-175951] N82-33810

MINES (EXCAVATIONS)
Stress distribution and pillar design in oil shale retorts
[PB82-176256] N82-33582

MINICOMPUTERS
Development of a minicomputer atmospheric noise model
[AD-A117851] N82-33936
Does man always close the loop in trying to pilot a large ship? N82-34066

MINING
An evaluation of 3 wet dust control techniques for face drills
[PB82-177320] N82-33808
Evaluation of the use of foam for dust control on face drills and crushers
[PB82-176215] N82-33809
Field survey of float dust in coal mining operations
[PB82-172719] N82-33812
Coal mining and ground-water resources in the United States
[PB82-182056] N82-33903

MIRROR FUSION
The 1981 magnetic-fusion theory program project summaries
[DE82-008102] N82-34260
BNL neutral-beam development group
[DE82-008852] N82-34266
Summary of Thomson-scattering data from the Tandem Mirror Experiment (TMX)
[DE82-014956] N82-34272

MIRRORS
Illumination from space with orbiting solar-reflector spacecraft
[NASA-TP-2065] N82-33421
MISSILE CONFIGURATIONS
An inviscid computational method for tactical missile configurations
[AD-A116904] N82-33415
MISSILE CONTROL
Principles of the radio control of pilotless objects (selected chapters)
[AD-A117547] N82-33377
Applying photogrammetry to real time collection of digital image data
[AD-A116770] N82-33687
Overview of the aerothermal environment of air-launched missiles
[AD-A116799] N82-33924
MISSILE SYSTEMS
Turbulence analysis by use of the fast Fourier transform --- for calculation of impact on missile systems
[AD-A117157] N82-33953
MISSILES
Dictionary of missile and artillery terms
[AD-A115995] N82-33414
MISSION PLANNING
Survey and update of F-14A mission profiles for TF30 engine usage
[AD-A116831] N82-33337
Spacelab mission 2: Experimental descriptions
[NASA-TM-82477] N82-33411
Atmospheric constraint statistics for the Space Shuttle mission planning
[NASA-TP-2069] N82-33417
MIST
Guidelines for the determination of atmospheric conditions of oil mists
[PB82-174251] N82-33908
MIXTURES
Theoretical and practical considerations of some aspects of gas chromatographic optimization N82-33453
Blended elemental titanium alloys
[DE82-012882] N82-33513
MODAL RESPONSE
Rotorcraft blade mode damping identification from random responses using a recursive maximum likelihood algorithm
[NASA-CR-3600] N82-33373
Application of the reduced basis method to nonlinear transient thermal analysis N82-33743
MODELS
A survey of ionospheric models: A preliminary report on the development of an ionospheric model thesaurus and users guide
[AD-A117659] N82-33935
MODEMS
HF wideband modem
[AD-A116859] N82-33603
MODULATORS
Time-frequency and space-frequency characteristics of optical modulators
[AD-A115650] N82-34221
MODULUS OF ELASTICITY
Feasibility study: Hollow plastic spheres to increase hydraulic fluid compressibility
[NASA-CR-169374] N82-33539
Vibrations of axially loaded stiffened cylindrical panels with elastic restraints
[TAE-439] N82-33730
MOISTURE CONTENT
Positron annihilation spectroscopy with magnetically analyzed beams
[NASA-TM-84535] N82-33435
MOISTURE RESISTANCE
Development of tough, moisture resistant laminating resins
[NASA-CR-3615] N82-33432
MOLD
New data on metabolism and action mechanism of mycotoxins N82-33989
MOLDING MATERIALS
Zirconium oxide molds for small molybdenum investment castings
[PB82-202995] N82-33519
MOLDS
Computer-aided design, drawing and manufacturing system for dies and molds
[NRC/CNR-TT-2030] N82-34101
MOLECULAR BEAM EPITAXY
Growth of HgCdTe by modified molecular beam epitaxy
[AD-A117752] N82-34199
Growth and Characterization of In(1-x)Ga(x) As(y)P(1-y) and GaAs using molecular beam epitaxy
[AD-A117507] N82-34282
MOLECULAR BEAMS
CO2 laser waveguiding in GaAs MBE layers
[AD-A117394] N82-33708
MOLECULAR COLLISIONS
Study of molecular collision dynamics for chemical laser systems
[AD-A117938] N82-33709
MOLECULAR EXCITATION
Pulsed excitation and collisional processes
[AD-A116937] N82-33707
MOLECULAR IONS
Auto-oxidation of sulphites
[NRC/CNR-TT-2023] N82-33465
MOLECULAR ORBITALS
Quantum chemical calculations for polymers and organic compounds
[NASA-CR-166414] N82-33528
MOLECULAR RELAXATION
Raman studies of reorientational and vibrational relaxation in dense fluids N82-33456
MOLECULAR STRUCTURE
Microwave spectroscopy of weakly bound molecular complexes N82-33451
Metal alkoxides: Models for metal oxides
[AD-A117947] N82-33503
Research on sources of gas phase metastable atoms and molecules
[AD-A117672] N82-34201
MOLECULAR WEIGHT
Theoretical and practical considerations of some aspects of gas chromatographic optimization N82-33453
The problem of ensuring a specified molecular weight in the process of emulsion polymerization
[NRC/CNR-TT-2026] N82-33529
MOLECULES
Triply differential studies of atomic and molecular photoionization using synchrotron radiation
[AD-A117247] N82-34198
MOLTEN SALT ELECTROLYTES
Molten phosphate electrolyte for the electrolysis of water
[DE82-008211] N82-33482
MOLTEN SALTS
Development of a solid absorption process for removal of sulfur from fuel gas
[DE82-012996] N82-33484
MOLYBDATES
Hydroprocessing of solvent-refined coal: Catalyst-screening results
[DE82-008568] N82-33479
MOLYBDENUM ALLOYS
Zirconium oxide molds for small molybdenum investment castings
[PB82-202995] N82-33519
MOMENTS
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354
MONITORS
A model of human decision making in multiple process monitoring situations N82-34065
MONKEYS
Comparison of rhesus and human spectral dynamic visual acuity
[AD-A115258] N82-34018
MONOCHROMATORS
Multichannel VUV rocketborne monochromator for low-level auroral measurements
[AD-A115815] N82-34220
MONOPOLE ANTENNAS
High power transportable VLF transmitter facility
[AD-A117419] N82-33623
MONOTONE FUNCTIONS
Accurate monotonicity-preserving cubic interpolation
[DE82-009964] N82-34157
MONTE CARLO METHOD
Importance of elastic scattering to particle direction determination in Monte Carlo calculations of DT reactions in flight
[DE82-015080] N82-34210
MORPHOLOGY
The effects of processing conditions on the reliability of cross-linked polyethylene cable insulation
[DE82-011712] N82-33543
MOTION
The effect of disuse on fast and slow skeletal muscle N82-33997
MOTION PERCEPTION
Comparison of rhesus and human spectral dynamic visual acuity
[AD-A115258] N82-34018
MOTION SICKNESS
Airsickness during Naval flight officer training: Advanced Squadron VT86-RIO (new syllabus)
[AD-A114685] N82-34011
A comprehensive system model for motion/space sickness. Preliminary results N82-34059
MOTION SIMULATORS
Visual/motion cue mismatch during a coordinated roll maneuver N82-34055
MOTIVATION
Experimental analysis of team performance: Methodological developments and research results
[AD-A116915] N82-34034
MOUNTAINS
Calderas and mineralization: Volcanic geology and mineralization in the Chianti caldera complex, Trans-Pecos Texas
[DE82-013263] N82-33941
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981
[PB82-176967] N82-33966
MOVING TARGET INDICATORS
Improving conflict alert performance using moving target detector data
[AD-A117691] N82-33370
MULLITES
Mullite-titanium dioxide solid solutions
[DE82-009031] N82-34288
MULTICHANNEL COMMUNICATION
A communications optical processing technique
[AD-A116047] N82-34219
MULTIPLE ACCESS
An architecture for database management standards
[PB82-176322] N82-34099
Analysis of space telescope data collection system
[NASA-CR-162090] N82-34322
MULTIPROCESSING (COMPUTERS)
Nearly on line scheduling of multiprocessor systems with memories
[AD-A116823] N82-34090
The DMS multiprocess execution environment
[AD-A117660] N82-34096
Cellular architectures for pattern recognition
[AD-A117049] N82-34110
MULTISPECTRAL BAND SCANNERS
Applications of texture analysis for rock types discrimination
[AD-A117076] N82-33798
MULTIVARIATE STATISTICAL ANALYSIS
Inequalities on distributions: Bivariate and multivariate
[AD-A116814] N82-34163
A concept of negative dependence using stochastic ordering
[AD-A116888] N82-34164
Problems in multivariate analysis and nonparametric statistics: Applications of the theory of combining tests
[AD-A117092] N82-34166
MUSCLES
The effect of disuse on fast and slow skeletal muscle N82-33997
MUSCULOSKELETAL SYSTEM
The effect of disuse on fast and slow skeletal muscle N82-33997
A dynamic model of the cervical spine and head
[AD-A114887] N82-34008

N

NACELLES
Advanced turboprop testbed systems study
[NASA-CR-167895] N82-33375
NASA PROGRAMS
NASA authorization and NOAA LANDSAT authorization for 1983, volume 2
[GPO-93-418] N82-34306
Making appropriations for the National Aeronautics and Space Administration
[H-REPT-97-897] N82-34308
NATURAL GAS
Stand-alone ignition devices
[PB82-180662] N82-33488
Evaluation of natural gas molten carbonate fuel cell power plants
[PB82-181272] N82-33881
NATURAL GAS EXPLORATION
Environmental aspects of potential petroleum exploration and exploitation in Antarctica: Forecasting and evaluating risks
[PB82-169772] N82-33907
NAVIER-STOKES EQUATION
Navier-Stokes computations for conventional and hollow projectile shapes at transonic velocities
[AD-A116866] N82-33355
Two dimensional viscous flow of a compressible fluid
[AD-A116913] N82-33667
NAVIGATION AIDS
Integrated systems of automatic radio equipment
[AD-A115670] N82-33602

Separation monitoring with four types of predictors on a cockpit display of traffic information N82-34063

NAVIGATION TECHNOLOGY SATELLITES

Prototype design and initial test evaluation of a Global Positioning System Time Transfer Receiver (GPS TTR) [NASA-TM-84721] N82-33364

NAVY

The Shock and Vibration Digest, volume 14, no. 1 [AD-A111336] N82-33561

NEAR INFRARED RADIATION

Observations of the reflection nebula NGC 7023 at 2.2 microns N82-34321

NECK (ANATOMY)

Research on the development of a statistical impact acceleration injury prediction model from -G(x) accelerator runs [AD-A116440] N82-34003

NEGATIVE IONS

Negative-ion-beam generation with the ORNL SITEX source [DE82-016042] N82-34211

Simple method of sheet plasma production for high current negative ion II (curved sheet plasma) [IPPJ-597] N82-34240

NEODYMIUM COMPOUNDS

Resolution of factors responsible for difficulty in growing single crystals of YAG [AD-A117401] N82-34279

NEPHELOMETERS

Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary [AD-A116794] N82-33925

Light scattering calculations for the nephelometer experiment on the 1981/1982 Jupiter Orbiter-Probe mission [NASA-CR-169418] N82-34323

NETWORK ANALYSIS

Framework for power-network analysis [DE82-012724] N82-33658

A note on COPE: A software tool for modeling and evaluating the performance of computing systems [FUB-7-1982] N82-34119

NEURAL NETS

Neuron selectivity: Single neuron and neuron networks [AD-A116686] N82-34013

NEURONS

An automated optical display system for visual physiology experiments [AD-A116499] N82-34004

Neuron selectivity: Single neuron and neuron networks [AD-A116686] N82-34013

NEUROPHYSIOLOGY

Neuron selectivity: Single neuron and neuron networks [AD-A116686] N82-34013

NEUTRAL BEAMS

A program to study the detection of target hits by directed energy weapons [AD-A117711] N82-34213

BNL neutral-beam development group [DE82-008852] N82-34266

NEUTRON RADIOGRAPHY

Development of nondestructive testing technique. Ultrasonic testing and radiographic testing [DE82-700448] N82-33726

NEUTRONS

A scaling law of neutron yield for DT discharge in plasma focus [IPPJ-600] N82-34254

NICKEL

Solvent extraction of nickel and copper from laterite-ammoniacal leach liquors [PB82-176587] N82-33518

NICKEL ALLOYS

Hydroprocessing of solvent-refined coal: Catalyst-screening results [DE82-008568] N82-33479

Fundamental research directed to advanced high temperature coating systems beyond the current state-of-the-art systems [AD-A117845] N82-33504

Studies on age-hardening in spinodally modulated alloys, experimental and theoretical [DE82-007957] N82-33506

Studies of metal: Semiconductor interfaces in catalysis and energy conversion [DE82-011863] N82-33509

Thermal conductivity of electroless nickel-phosphorus alloy plating [DE82-013529] N82-33510

Overlay metallic-cermet alloy coating systems --- for gas turbine engines [NASA-CASE-LEW-13639-1] N82-33522

The fatigue notch factor revisited [TAE-446] N82-33732

NICKEL CADMIUM BATTERIES

Nickel-cadmium cell performance recovery and reconditioning [SD-TR-82-63] N82-33823

Use of the Charge/Discharge (C/D) ratio to aument voltage limit (V sub T) charge control in the ERBS spacecraft [NASA-TM-83991] N82-33824

Short-circuit formation during NiCd cell reversal [AD-A117912] N82-33836

NICKEL COMPOUNDS

Nickel-zinc batteries for RPV applications [AD-A115843] N82-33832

NICKEL PLATE

Thermal conductivity of electroless nickel-phosphorus alloy plating [DE82-013529] N82-33510

NIGHT VISION

High energy surfuryl chloride batteries [AD-A117106] N82-33833

Properties of SOC12 electrolyte solutions [AD-A117306] N82-33834

NIOBIUM

Superconductive niobium oxide tunnel device program [AD-A117000] N82-33642

NITRILES

Development of tough, moisture resistant laminating resins [NASA-CR-3615] N82-33432

NITROGEN

Reference book for the nitrogen industry worker in two volumes, volume 1 [AD-A115651] N82-33569

Pulsed excitation and collisional processes [AD-A116937] N82-33707

Development of nitrogen sensor for determination of PN(2) in body tissues [AD-A116607] N82-34005

Microwave energy coupling in a nitrogen breakdown plasma [AD-A117900] N82-34258

NITROGEN OXIDES

Preliminary economic analysis of NO sub x flue-gas treatment processes using TVA and EPRI economic premises [DE82-902223] N82-33895

NITROUS OXIDES

Low NOx heavy fuel combustor concept program [NASA-CR-165481] N82-33827

NOISE (SOUND)

Variations in noise dosimeter readings of fluctuating noise [AD-A115763] N82-34002

NOISE MEASUREMENT

Noise measurement in wind tunnels, workshop summary [NASA-TM-84219] N82-34188

Study of the source function by the causality methods defined by Ribner and Siddon [PB82-205170] N82-34196

NOISE PREDICTION

Sound attenuation over ground cover 3 N82-34337

NOISE REDUCTION

Preprocessing techniques in transient analysis [AD-A116860] N82-34143

Circumferentially segmented duct lines optimized for axisymmetric and standing wave sources --- reducing noise from turbofan engines galerkin method acoustic attenuation [NASA-TP-2075] N82-34190

NOISE SPECTRA

Equilibrium noise in ion selective field effect transistors [AD-A117525] N82-33652

NOMENCLATURES

NATO glossary of terms and definitions (English and French) [AD-A117715] N82-34290

NONDESTRUCTIVE TESTS

Positron annihilation spectroscopy with magnetically analyzed beams [NASA-TM-84535] N82-33435

Nondestructive inspection and evaluation of composite-material flywheels [DE82-014875] N82-33444

Ultrasonic measurement of case depth in case hardened steels. Evaluation of feasibility for the ultrasonic measurement of case depth in case hardened steels [AD-A117901] N82-33505

Advanced nondestructive evaluation (ultrasonic pulser/receiver technology) [AD-A117841] N82-33724

Development of nondestructive testing technique. Ultrasonic testing and radiographic testing [DE82-700448] N82-33726

Nondestructive method for determining fatigue and stress-corrosion damage [AD-A117631] N82-33774

NONEQUILIBRIUM FLOW

The fluid mechanics of non-nucleating wet steam flows [CUED/A-TURBO/TR-111] N82-33662

NONEQUILIBRIUM PLASMAS

Effects of ion-bounce resonances on ballooning-interchange modes [DE82-014405] N82-34268

NONISOTHERMAL PROCESSES

Finite element modeling of nonisothermal polymer flows [NASA-CR-169355] N82-33525

NONLINEAR EQUATIONS

Research in structural and solid mechanics, 1982 [NASA-CP-2245] N82-33739

A semi-implicit dynamic relaxation algorithm for static nonlinear structural analysis N82-33740

Minimization versus homotopy algorithms N82-33741

NONLINEAR EVOLUTION EQUATIONS

Lax-pair operators for squared eigenfunctions in the inverse scattering transformations [IPPJ-589] N82-34244

NONLINEAR FILTERS

Stochastic and adaptive systems [AD-A117029] N82-34182

NONLINEAR SYSTEMS

Fault diagnosis of nonlinear analog circuits. Volume 1. DC diagnosis of hard failures [AD-A117567] N82-33645

Existence of a global weak solution to the nonlinear waterhammer program [DE82-010717] N82-33678

NONLINEARITY

Susceptibility of symmetric structures to nonlinear torsional coupling N82-33759

NONPARAMETRIC STATISTICS

Problems in multivariate analysis and nonparametric statistics: Applications of the theory of combining tests [AD-A117092] N82-34166

NORMALIZING (STATISTICS)

Logarithmic derivatives of two normalizing functions [AD-A117516] N82-34180

NORTH AMERICA

Grand Junction Area Office, United States Department of Energy 1980/1981 activities report [DE82-009638] N82-33806

NORWAY

NORSEX 1979 microwave remote sensing data report [NASA-CR-165967] N82-33796

NOTCH SENSITIVITY

The fatigue notch factor revisited [TAE-446] N82-33732

NOTCH STRENGTH

Correlations for the fracture of composite materials [PB82-181421] N82-33446

A preliminary study of crack initiation and growth at stress concentration sites [NASA-CR-169358] N82-33738

NUCLEAR EMULSIONS

Inelastic interactions of 4.5 GeV/c protons with emulsion nuclei not accompanied by relativistic charged particles [DE82-701020] N82-34207

NUCLEAR FUSION

Desorption and related phenomena relevant to fusion devices [IPPJ-AM-22] N82-34234

The 1981 magnetic-fusion theory program project summaries [DE82-008102] N82-34260

BNL neutral-beam development group [DE82-008852] N82-34266

Fusion engineering device. Volume 1: Mission and program summary [DE82-008931] N82-34267

NUCLEAR HEAT

Design and evaluation of a pressure sensor for high temperature nuclear application [EGG-2135] N82-33682

NUCLEAR RADIATION

Some computer applications and digital image processing in nuclear medicine N82-34000

NUCLEATION

The fluid mechanics of non-nucleating wet steam flows [CUED/A-TURBO/TR-111] N82-33662

Optical Studies of model binary miscibility gap system [NASA-TM-82494] N82-33683

Ice forming experiment [NASA-CR-170623] N82-33948

NULL ZONES
An iterative phase-only nulling method
[AD-A116949] N82-33604
NUMERICAL ANALYSIS
Computation of two-dimensional time-dependent natural convection of compressible fluid in a rectangular enclosure
[PB82-198797] N82-33679
Analysis of a kite anemometer
[DE82-009058] N82-33691
Asymptotic and numerical methods for vector systems of singularly-perturbed boundary value problems
[AD-A117111] N82-34141
NUMERICAL FLOW VISUALIZATION
Acta Mechanica Sinica (selected articles)
[AD-A115634] N82-33665
Incompressible flow in a rapidly rotating cylinder with a source/sink distribution in the lateral wall and a free inner boundary
[DE82-011031] N82-33674
Simulation of the fluctuating field of a forced jet
[NASA-TM-84506] N82-34191
NUMERICAL STABILITY
Finite difference approximations and stability of distributed parameter systems
[PB82-177635] N82-34158

O

OBLATE SPHEROIDS
Equatorial motion about an oblate primary
[AD-A117641] N82-34324
OBSTACLE AVOIDANCE
Terrain following/terrain avoidance system concept development N82-33363
OCEAN BOTTOM
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
The marine geology of the Bahama Escarpment N82-33916
Seafloor earthquake measurement system. Volume 2: Electronic hardware description
[DE82-009319] N82-33942
A summary of the results of a study of acoustic bottom interaction in a range dependent environment
[AD-A116891] N82-33970
Aeromagnetic detection and definition of seamounts
[AD-A117153] N82-33971
OCEAN CURRENTS
Observations of vertically propagating equatorially-trapped waves in the deep western Indian Ocean
[NASA-CR-169375] N82-33974
Oceanic frontal stability: A numerical model
[AD-A115519] N82-33976
OCEAN MODELS
Oceanic frontal stability: A numerical model
[AD-A115519] N82-33976
Elliptic equation solvers for NORDA ocean models and a study of equatorial ocean dynamics
[AD-A117374] N82-33977
OCEAN SURFACE
The mean and variance of skywave radar sea-echo power spectra for discrete ionospheric multipath
[PB82-174236] N82-33631
SEASAT satellite radar altimetry data processing system
[AD-A115972] N82-33797
Statistical analysis of upper ocean time series of vertical shear
[AD-A117286] N82-33969
Modeling and adjusting global ocean tides using SEASAT altimeter data
[AD-A115841] N82-33972
Irregular wave runup on smooth slopes
[AD-A113648] N82-33975
Doppler spectra of sea-surface backscatter at high acoustic frequencies
[AD-A117682] N82-33978
Factors relating surface visibility to the total optical depth in the marine regime
[AD-A117836] N82-34232
OCEAN TEMPERATURE
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973
OCEAN THERMAL ENERGY CONVERSION
Ocean thermal energy conversion, fiscal year 1981. Public Law 96-320 N82-33888
Five OTEC biofouling and corrosion experiments at Keahole Point, 1976 to 1980
[DE82-008086] N82-33987
OCEANOGRAPHIC PARAMETERS
Oceanic frontal stability: A numerical model
[AD-A115519] N82-33976
OCEANOGRAPHY
Design and laboratory testing of a prototype linear temperature sensor
[AD-A117245] N82-33688
SEASAT satellite radar altimetry data processing system
[AD-A115972] N82-33797
OCEANS
High precision tidal gravity
[AD-A116941] N82-33934
OFFSHORE ENERGY SOURCES
Environmental aspects of potential petroleum exploration and exploitation in Antarctica: Forecasting and evaluating risks
[PB82-169772] N82-33907
OIL EXPLORATION
Environmental aspects of potential petroleum exploration and exploitation in Antarctica: Forecasting and evaluating risks
[PB82-169772] N82-33907
OIL POLLUTION
A theoretical appraisal of the joint effects of turbulence and of Langmuir circulations on the dispersion of oil spilled in the sea
[AD-A117844] N82-33894
OIL SLICKS
Analysis of remote sensing data collected for detection and mapping of oil spills: Reduction and analysis of multi-sensor airborne data of the NASA Wallops oil spill exercise of November 1978
[NASA-CR-165886] N82-33891
A theoretical appraisal of the joint effects of turbulence and of Langmuir circulations on the dispersion of oil spilled in the sea
[AD-A117844] N82-33894
OILS
Technique for the aerobic cultivation of microorganisms in water-in-oil emulsions
[NRC/CNR-TT-2031] N82-33980
ON-LINE SYSTEMS
Nearly on line scheduling of multiprocessor systems with memories
[AD-A116823] N82-34090
OPACITY
Sampling and measurement of particulate emissions from refinery installations
[PB82-174665] N82-33905
OPERATIONS RESEARCH
Interruptible supersaturated two-level designs
[AD-A115786] N82-34181
OPERATOR PERFORMANCE
HRTES Human Resources Test and Evaluation System. Volume 1: Test procedures
[AD-A115594] N82-34029
HRTES Human Resources Test and Evaluation System. Volume 2: Supplement
[AD-A115595] N82-34030
Subjective scaling of mental workload in a multi-task environment N82-34048
OPERATORS (MATHEMATICS)
Operator split methods in the numerical solution of the finite deformation elastoplastic dynamic problem N82-33742
OPERATORS (PERSONNEL)
Modeling of human operator dynamics in simple manual control utilizing time series analysis --- tracking (position) N82-34038
A gunner model for an AAA tracking task with interrupted observations N82-34039
Modeling human target acquisition in ground-to-air weapon systems N82-34040
The effect of visual information on the manual approach and landing N82-34041
The effects of multiplicative motor noise on the optimal human operator model N82-34042
Training aircraft design considerations based on the successive organization of perception in manual control N82-34043
An experimental study of human pilot's scanning behavior N82-34044
Parametric identification of human operator models N82-34045
A computer simulation approach to measurement of human control strategy N82-34046
A computer aided workstation assesor for crew operations - WOSTAS
[AD-A116045] N82-34079
OPTICAL DATA PROCESSING
White light optical processing and holography
[AD-A117506] N82-33689
Interactive digital image processing for terrain data extraction
[AD-A116881] N82-34107
A communications optical processing technique
[AD-A116047] N82-34219
OPTICAL EQUIPMENT
Electron beam generated holographic optical element research
[AD-A117052] N82-33685
An automated optical display system for visual physiology experiments
[AD-A116499] N82-34004
OPTICAL FILTERS
A method of polymer design and synthesis for selective infrared energy absorption
[AD-A117485] N82-33540
OPTICAL MEASURING INSTRUMENTS
Particulate-analysis instrumentation for systems
[DE82-012464] N82-33693
OPTICAL PATHS
The aerospace long-path multiple reflection cell facility
[SD-TR-82-60] N82-34218
OPTICAL PROPERTIES
Development of a direct-absorption high-temperature gas receiver
[DE82-010168] N82-33838
Optical flow and texture variables useful in simulating self motion
[AD-A117016] N82-34081
Characterization of infrared optical properties of layered semiconductors
[AD-A117729] N82-34285
OPTICAL PUMPING
Micom program in light control by light
[AD-A117159] N82-33706
OPTICAL REFLECTION
A tutorial solution to scattering of radiation in a thin atmosphere bounded below by a diffusely reflecting, absorbing surface
[NASA-TP-2077] N82-33918
OPTIMAL CONTROL
System optimization by periodic control
[AD-A117815] N82-33402
The effects of multiplicative motor noise on the optimal human operator model N82-34042
Pilot model hypothesis testing N82-34047
OPTIMIZATION
Theoretical and practical considerations of some aspects of gas chromatographic optimization N82-33453
Electronic tester study
[DE82-016028] N82-33657
Minimization versus homotopy algorithms N82-33741
Application of the reduced basis method to nonlinear transient thermal analysis N82-33743
Optimal staging of endoreversible heat engines
[DE82-900742] N82-33841
Levels of steering control: Reproduction of steering-wheel movements N82-34071
Users guide for SOL/QPSOL: A FORTRAN package for quadratic programming
[AD-A117607] N82-34114
Newton's method
[DE82-013692] N82-34134
An O(NlogN) planar travelling salesman heuristic based on spacefilling curves
[AD-A115357] N82-34136
The strength of surrogate constraints for the linear zero-one integer programming problem
[AD-A115736] N82-34137
Optimization algorithms on random graphs
[AD-A115804] N82-34140
Optimal grouping, spacing, stratification and piecewise constant approximation
[AD-A117023] N82-34168
A quantile domain perspective on the relationships between optimal grouping, spacing and stratification problems
[AD-A116944] N82-34172
Circumferentially segmented duct lines optimized for axisymmetric and standing wave sources --- reducing noise from turbofan engines galerkin method acoustic attenuation
[NASA-TP-2075] N82-34190
Scheduling maintenance operations which cause age-dependant failure rate changes
[AD-A117267] N82-34293
ORBIT CALCULATION
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889-VOL-2] N82-33425
Equatorial motion about an oblate primary
[AD-A117641] N82-34324
ORBITAL MECHANICS
Equatorial motion about an oblate primary
[AD-A117641] N82-34324

ORGANIC COMPOUNDS
Quantum chemical calculations for polymers and organic compounds
[NASA-CR-166414] N82-33528
ORGANIC NITRATES
Synthesis and characterization of new insensitive high energy polynitramine compound, 2,4,8,10-tetranitro-2,4,8,10-tetraazaspiro (5.5) undecane (TNSU)
[AD-A116832] N82-33533
ORGANISMS
Bioelectric fields: Their sources, nature and purpose N82-33991
ORGANOMETALLIC COMPOUNDS
Ultraviolet enhanced deposition from pentacarbonyl-iron on gallium arsenide, quartz, and sapphire
[AD-A116800] N82-34278
OROGRAPHY
Geologic evolution of the Cordillera Darwin orogenic core complex, Southern Andes N82-33917
ORTHOSTATIC TOLERANCE
Effects of prior physical exertion on tolerance to hypoxia, orthostatic stress, and physical fatigue
[AD-A114741] N82-34009
OSCILLATING FLOW
Study of periodic turbulent pipe flow
[PB82-201534] N82-33680
OSCILLATIONS
Reflections on an F-43 in flight emergency
[AD-A116873] N82-33358
Extrapolation algorithms and their use for the evaluation of beam-beam effects on the motion and polarization of particles in storage rings
[DE82-011425] N82-34203
OTTO CYCLE
Optimal staging of endoreversible heat engines
[DE82-900742] N82-33841
OUTLIERS (STATISTICS)
Robust regression procedures for predictor variable outliers
[AD-A117022] N82-34167
OUTPUT
Intermediate photovoltaic system application experiment operational performance. Volume 8: Newman Power Station, El Paso, Texas
[DE82-014247] N82-33858
Nonalgebraic symbol manipulators for use in scientific and engineering modeling: Introducing the FORSE (FORTRAN Symbol Expander)
[DE82-009818] N82-34118
OVERPRESSURE
Sonic boom measurement test plan for Space Shuttle STS-2 reentry
[NASA-TM-84858] N82-34186
OXIDATION
Auto-oxidation of sulphites
[NRC/CNR-TT-2023] N82-33465
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472
Development of a direct-absorption high-temperature gas receiver
[DE82-010166] N82-33838
OXIDATION-REDUCTION REACTIONS
Chemical and electrochemical behavior of the Cr(3)/Cr(2) half cell in the NASA Redox Energy Storage System
[NASA-TM-82913] N82-33463
OXIDES
The behaviour of Al electrodes in aqueous solutions
[NDRE/PUBL-81/1003] N82-33460
OXYGEN
Auto-oxidation of sulphites
[NRC/CNR-TT-2023] N82-33465
OXYGEN CONSUMPTION
Aeration-agitation control based on a mathematical model of the fermentation process
[NRC/CNR-TT-2029] N82-33461
Ventilatory responses to exercise while eliciting the relaxation response
[AD-A115102] N82-34015
OXYGEN METABOLISM
Respiratory adaptation to acute metabolic acidosis in goats with ablated carotid bodies
[AD-A116657] N82-33984
Oxygen transport to human tissues
[AD-A115904] N82-34007
OZONE
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899

P

PACKAGING
Explosives instrumentation group trial 6/77-propellant fire trials (series 2)
[AD-A117695] N82-33555
PACKETS (COMMUNICATION)
Data flow computer architecture
[DE82-014632] N82-34098
PAINTS
Ultraviolet-radiation-curable paints
[DE82-015717] N82-33545
An experimental study of bolted shear connections
[PB82-201518] N82-33788
PANEL FLUTTER
Vibrations of axially loaded stiffened cylindrical panels with elastic restraints
[TAE-439] N82-33730
PANELS
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-014875] N82-33444
PARABOLIC DIFFERENTIAL EQUATIONS
IFD: An implicit finite-difference computer model for solving the parabolic equation
[AD-A117701] N82-34156
PARACHUTE DESCENT
Development of methods for assessment of gliding parachute applications
[AD-A117103] N82-33356
PARACHUTES
Development of methods for assessment of gliding parachute applications
[AD-A117103] N82-33356
PARALLEL PROCESSING (COMPUTERS)
the finite element machine: An experiment in parallel processing N82-33752
Cellular architectures for pattern recognition
[AD-A117049] N82-34110
PARAMETER IDENTIFICATION
Rotorcraft blade mode damping identification from random responses using a recursive maximum likelihood algorithm
[NASA-CR-3600] N82-33373
MSTRIP2: Parameters of microstrip transmission lines and of coupled pairs of lines. 1978 version and its application
[AD-A117364] N82-33615
Decision-Feedback Equalizer Simulation (DFES): Description of variables
[AD-A117898] N82-33626
System identification: A question of uniqueness, revisited N82-33763
Quantiles, parametric-select density estimations, and bi-information parameter estimators
[AD-A117460] N82-34153
PARTIAL DIFFERENTIAL EQUATIONS
Implementation of a C-1 triangular element based on the P-version of the finite element method N82-33749
Moving finite elements in 2-D
[AD-A117078] N82-34142
Variational analysis and approximate solutions for transport phenomena
[AD-A117110] N82-34147
PARTICLE ACCELERATORS
Extrapolation algorithms and their use for the evaluation of beam-beam effects on the motion and polarization of particles in storage rings
[DE82-011425] N82-34203
Versatile secondary beam for the meson area
[DE82-014275] N82-34209
PARTICLE BEAMS
Versatile secondary beam for the meson area
[DE82-014275] N82-34209
PARTICLE COLLISIONS
Multiphoton ionization and fragmentation pathways of polyatomic molecules: Studies with a laser time-of-flight mass spectrometer N82-33457
High energy hadron-hadron collisions
[DE82-011255] N82-34206
Self-consistent analysis of collisional loss in a spatially varying magnetic mirror
[IPPJ-588] N82-34245
PARTICLE DENSITY (CONCENTRATION)
Monitoring of submicrometer particles in sealed fire areas
[PB82-175951] N82-33810
The multi-parameter remote measurement of rainfall
[NASA-TM-83971] N82-33947
PARTICLE EMISSION
Sampling and measurement of particulate emissions from refinery installations
[PB82-174665] N82-33905
PARTICLE MASS
The Shock and Vibration Digest, volume 14, no. 2
[AD-A111521] N82-33564
Acoustic impedance measurement methods N82-33565
Sampling and measurement of particulate emissions from refinery installations
[PB82-174665] N82-33905
PARTICLE MOTION
The Shock and Vibration Digest, volume 14, no. 2
[AD-A111521] N82-33564
Acoustic impedance measurement methods N82-33565
PARTICLE PRODUCTION
Central production and small-angle elastic scattering in the valon model
[DE82-008367] N82-34205
PARTICLE SIZE DISTRIBUTION
Atomization characteristics of coal-water mixtures
[DE82-009093] N82-33477
Particulate-analysis instrumentation for systems
[DE82-012464] N82-33693
Field survey of float dust in coal mining operations
[PB82-172719] N82-33812
The multi-parameter remote measurement of rainfall
[NASA-TM-83971] N82-33947
Cloud and precipitation particle size spectra
[AD-A117457] N82-33956
PARTICLE TRAJECTORIES
Transport code study of electron cyclotron heating in Tokamaks
[IPPJ-582] N82-34249
PARTICLES
Development of a direct-absorption high-temperature gas receiver
[DE82-010168] N82-33838
PARTICULATE SAMPLING
In-situ measurement of particulate in turbulent duct flows
[DE82-010291] N82-33671
Guidelines for the determination of atmospheric conditions of oil mists
[PB82-174251] N82-33908
PARTITIONS (MATHEMATICS)
Optimal grouping, spacing, stratification and piecewise constant approximation
[AD-A117023] N82-34168
PATTERN METHOD (FORECASTING)
Prospective significance of temperate-zone carbon pool transients, 1980 - 2010
[DE82-011866] N82-33896
PATTERN RECOGNITION
Cellular architectures for pattern recognition
[AD-A117049] N82-34110
PAVEMENTS
Pavement roughness evaluations using a Mays Ride Meter
[PB82-177841] N82-33580
Pavement thickness, surface evenness and construction practice
[PB82-202599] N82-33586
Design of overlays based on pavement condition, roughness, and deflections
[PB82-201369] N82-33588
The Catskill-Cairo experimental rigid pavement: A ten-year progress report
[PB82-201229] N82-33589
Placement of an experimental heater-scarified in-place recycled pavement
[PB82-197237] N82-33590
PAYLOADS
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354
PENDULUMS
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-3619] N82-33734
PENETRATION
A fracture and ballistic penetration resistant laminate
[AD-A117142] N82-33439
Charge penetration effects in rare-earth crystal fields
[AD-A117494] N82-34283
PERCEPTION
Stress, anxiety, and cognitive interference: Reactions to tests
[AD-A113564] N82-34031
Subjective scaling of mental workload in a multi-task environment N82-34048
PERFLUORO COMPOUNDS
High performance channel injection sealant invention abstract
[NASA-CASE-ARC-14408-1] N82-33523

PERFORMANCE PREDICTION
Shuttle STS-2 mission communication systems RF coverage and performance predictions. Volume 1: Ascent
[NASA-TM-84853] N82-33594
Nonlinear constitutive theory for turbine engine structural analysis N82-33744
Theoretical and experimental power from large horizontal-axis wind turbines
[NASA-TM-82944] N82-33830
An EEG predictor of performance decrement in a vigilance task
[AD-A116960] N82-34014
Sixteenth Annual Conference on Manual Control
[NASA-TM-84273] N82-34037
Modeling human target acquisition in ground-to-air weapon systems N82-34040
A model-based technique for predicting pilot opinion ratings for large commercial transports N82-34050
An analytical prediction of pilot ratings utilizing human pilot model N82-34051
PERFORMANCE TESTS
Development of an energy test method for a dedicated water-heating pump
[PB82-170069] N82-33575
A conversational test for comparing voice systems using working two-way communication links
[AD-A116054] N82-33599
Assessment and development of oculomotor flying skills by the application of the channel theory of vision
[AD-A115325] N82-34035
Fusion engineering device. Volume 3: Test plan
[DE82-008933] N82-34274
PERIODIC FUNCTIONS
Perturbation of homoclinics and subharmonics in Duffing's equation
[AD-A117390] N82-34152
PERIODIC VARIATIONS
Intermediate photovoltaic system application experiment operational performance. Volume 6: Newman Power Station, El Paso, Texas
[DE82-008483] N82-33846
Intermediate photovoltaic system application experiment operational performance. Volume 8: Newman Power Station, El Paso, Texas
[DE82-014247] N82-33858
Spectral equivalence of deterministic and stochastic models for time series with a periodic component
[AD-A117718] N82-34179
PERMAFROST
Improving electric grounding in frozen materials
[AD-A117873] N82-33648
PERMEABILITY
New pressure test for determining coefficient of permeability of rock masses
[AD-A116982] N82-33927
PERT
An assessment of PERT as a technique for schedule planning and control
[NASA-TM-83265] N82-33981
PERTURBATION
The structure and growth of the mixing layer region of a round jet
[SU-TF-17] N82-33664
PERTURBATION THEORY
Solution of Von Karman's plate equation with perturbation and series summation N82-33761
Perturbation of homoclinics and subharmonics in Duffing's equation
[AD-A117390] N82-34152
Inelastic strong interactions at high energies
[DE82-007984] N82-34215
PETROLEUM PRODUCTS
Establishing a reliable source of fuel for Department of Defense requirements: Effective petroleum, oil and lubricant financial management
[PB82-170812] N82-34299
PHASE CHANGE MATERIALS
Energy storage using phase-change materials for active solar heating and cooling: An evaluation of future research and development direction
[DE82-014656] N82-33857
PHASE CONTROL
Method and apparatus for self-calibration and phasing of array antenna
[NASA-CASE-NPO-15920-1] N82-33593
PHASE DETECTORS
A synchronous phase detection system for an optical interferometric sensor
[AD-A117435] N82-34229
PHASE MODULATION
Properties of even length Barker codes and specific polyphase codes with Barker type autocorrelation functions
[AD-A117415] N82-33622
PHASE TRANSFORMATIONS
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501
Advanced joining technology
[AD-A117503] N82-33715
Central limit theorems in the area of large deviations for some dependent random variables
[AD-A117714] N82-34155
PHASED ARRAYS
Method and apparatus for self-calibration and phasing of array antenna
[NASA-CASE-NPO-15920-1] N82-33593
An iterative phase-only nulling method
[AD-A116949] N82-33604
PHENOLIC EPOXY RESINS
Advanced carbon fabric/phenolics for thermal protection applications
[AD-A116829] N82-33534
PHONONS
An analytical solution to the problems of 3-phonon interaction and second harmonic generation in a solid plate
[AD-A117907] N82-34195
PHOSPHATES
Molten phosphate electrolyte for the electrolysis of water
[DE82-008211] N82-33482
PHOSPHORIC ACID FUEL CELLS
Assessment of a coal-gasification fuel-cell system for utility application
[DE82-903667] N82-33870
Evaluation of natural gas molten carbonate fuel cell power plants
[PB82-181272] N82-33881
PHOSPHORS
Intagliated phosphor screen image tube project
[NASA-CR-170445] N82-33635
PHOTOACOUSTIC SPECTROSCOPY
Photoacoustic spectroscopy at visible and infrared wavelengths N82-33448
PHOTOCHEMICAL REACTIONS
Research investigation directed toward extending the useful range of the electromagnetic spectrum
[AD-A117626] N82-33618
Research directed at developing a classical theory to describe isotope separation of polyatomic molecules illuminated by intense infrared radiation
[DE82-009652] N82-34208
PHOTOCHROMISM
Attenuation of high intensity reradiated light by photochromic glass
[AD-A117424] N82-34227
PHOTODISSOCIATION
Research directed at developing a classical theory to describe isotope separation of polyatomic molecules illuminated by intense infrared radiation
[DE82-009652] N82-34208
PHOTOELECTRON SPECTROSCOPY
Anomalous reorganization free energies in optical electron transfer in solution
[AD-A117680] N82-34202
PHOTOGRAMMETRY
Applying photogrammetry to real time collection of digital image data
[AD-A116770] N82-33687
An analysis of the max-min texture measure
[AD-A116768] N82-33799
PHOTOGRAPHIC FILM
Intagliated phosphor screen image tube project
[NASA-CR-170445] N82-33635
PHOTOINTERPRETATION
Analysis of interactive graphics display equipment for an automated photo interpretation system
[AD-A117647] N82-34115
PHOTOIONIZATION
Multiphoton ionization and fragmentation pathways of polyatomic molecules: Studies with a laser time-of-flight mass spectrometer N82-33457
Triply differential studies of atomic and molecular photoionization using synchrotron radiation
[AD-A117247] N82-34198
PHOTOLYSIS
Ultraviolet enhanced deposition from pentacarbonyl-iron on gallium arsenide, quartz, and sapphire
[AD-A116800] N82-34278
PHOTOMICROGRAPHY
Optical Studies of model binary miscibility gap system
[NASA-TM-82494] N82-33683
PHOTONICS
Photonic seeker development
[AD-A117160] N82-34225
PHOTOVOLTAIC CELLS
Design description of the Tangaye Village photovoltaic power system
[NASA-TM-82917] N82-33828
Intermediate photovoltaic system application experiment operational performance. Volume 6: Newman Power Station, El Paso, Texas
[DE82-008483] N82-33846
Intermediate photovoltaic system application experiment operational performance. Volume 8: Newman Power Station, El Paso, Texas
[DE82-014247] N82-33858
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory
[DE82-010867] N82-33866
Data report for the Northwest Residential Experiment Station, December 1981
[DE82-016027] N82-33868
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Beverly High School, Beverly, Mass.
[DE82-008622] N82-33879
Competition in the photovoltaics industry: A question of balance
[PB82-171570] N82-33886
Toxicity of silicon compounds
[DE82-014245] N82-34022
PHYSICAL EXERCISE
Prolonged self-paced hard physical exercise comparing trained and untrained men
[AD-A116608] N82-34006
Effects of prior physical exertion on tolerance to hypoxia, orthostatic stress, and physical fatigue
[AD-A114741] N82-34009
Ventilatory responses to exercise while eliciting the relaxation response
[AD-A115102] N82-34015
PHYSICAL PROPERTIES
The strength of weathered window glass using surface characteristics
[PB82-172735] N82-33546
PHYSIOLOGICAL EFFECTS
Effect of local vibration on divers working under water N82-33992
Influence of the diving response and submersion on the breath-holding time in man N82-33998
Oxygen transport to human tissues
[AD-A115904] N82-34007
Ventilatory responses to exercise while eliciting the relaxation response
[AD-A115102] N82-34015
Microclimate cooling for combat vehicle crewmen
[AD-A117156] N82-34083
PHYSIOLOGY
Bioelectric fields: Their sources, nature and purpose N82-33991
PILOT PERFORMANCE
The effects of pilot experience of acquiring instrument flight skills, phase 2
[AD-A113576] N82-34033
The effect of visual information on the manual approach and landing N82-34041
Training aircraft design considerations based on the successive organization of perception in manual control N82-34043
Pilot model hypothesis testing N82-34047
A model-based technique for predicting pilot opinion ratings for large commercial transports N82-34050
An analytical prediction of pilot ratings utilizing human pilot model N82-34051
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities N82-34052
Pilot opinions of sampling effects in lateral-directional control N82-34053
Visual/motion cue mismatch during a coordinated roll maneuver N82-34055
Modeling lateral acceleration effects on pilot performance N82-34058
A comprehensive system model for motion/space sickness. Preliminary results N82-34059
Application of a pilot control strategy identification technique to a joint FAA/NASA ground-based simulation of head-up displays for CTOL aircraft N82-34061
Combined discrete network. Continuous control modelling of operator behavior N82-34064
PILOT PLANTS
Conversion of waste plastics to fuel oil
[DE82-002454] N82-33873
PILOT TRAINING
Airsickness during Naval flight officer training: Advanced Squadron VT86-RIO (new syllabus)
[AD-A114685] N82-34011
The effects of pilot experience of acquiring instrument flight skills, phase 2
[AD-A113576] N82-34033

Does man always close the loop in trying to pilot a large ship? N82-34068
PILOTS (PERSONNEL)
The effect of stimulus-central processing-response compatibility and resource competition on pilot performance
[AD-A113754] N82-34032
Assessment and development of oculomotor flying skills by the application of the channel theory of vision
[AD-A115325] N82-34035
PINCH EFFECT
Pinch-reflex-diode scaling on the aurora pulser
[AD-A116055] N82-33638
Plasma wave turbulence and particle heating caused by electron beams, radiation and pinches
[AD-A117862] N82-34257
PIONS
Central production and small-angle elastic scattering in the valon model
[DE82-008367] N82-34205
PIPE FLOW
Existence of a global weak solution to the nonlinear waterhammer program
[DE82-010717] N82-33678
Study of periodic turbulent pipe flow
[PB82-201534] N82-33680
PIPES (TUBES)
Calorimetric measurements of emittance of pipe surfaces: Influence of enclosure diameter, test pipe length and an argon atmosphere
[DE82-009404] N82-33675
Design and operation of an apparatus for calorimetric emittance measurements of pipe surfaces
[DE82-008713] N82-33676
PISTON ENGINES
Exhaust emissions reduction for intermittent combustion aircraft engines
[NASA-CR-167914] N82-33392
PITCH (INCLINATION)
Reflections on an F-43 in flight emergency
[AD-A116873] N82-33358
PITTING
Five OTEC biofouling and corrosion experiments at Keahole Point, 1976 to 1980
[DE82-008086] N82-33987
PLANAR STRUCTURES
Design of microstrip linear array antennas by computer
[AD-A117399] N82-33620
The planar doped barrier: A new class of electronic devices
[AD-A117307] N82-33644
PLANE WAVES
The Shock and Vibration Digest, volume 14, no. 2
[AD-A111521] N82-33564
Acoustic impedance measurement methods N82-33565
PLANETARY ATMOSPHERES
Activities in planetary geology for the physical and earth sciences
[NASA-EP-179] N82-33789
PLANETARY GEOLOGY
Activities in planetary geology for the physical and earth sciences
[NASA-EP-179] N82-33789
A bibliography of planetary geology principal investigators and their associates, 1981 - 1982
[NASA-CR-3593] N82-34313
PLANETARY GRAVITATION
High precision tidal gravity
[AD-A116941] N82-33934
PLANETS
Activities in planetary geology for the physical and earth sciences
[NASA-EP-179] N82-33789
PLANFORMS
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357
PLANKTON
Spatial distributions of phytoplankton: Limitations of power spectrum techniques N82-33968
PLANTS (BOTANY)
Air pollutant production by algal cell cultures
[NASA-CR-166384] N82-34076
PLASMA CONTROL
The 1981 magnetic-fusion theory program project summaries
[DE82-008102] N82-34260
Tokamak confinement experiments
[DE82-009301] N82-34265
Suppression of plasma formation in waveguide antennas for lower-hybrid heating
[DE82-014392] N82-34269
PLASMA CURRENTS
An analysis of current drive by travelling wave based on theory of intrinsic stochasticity
[IPPJ-575] N82-34235
Simple method of sheet plasma production for high current negative ion II (curved sheet plasma)
[IPPJ-597] N82-34240
Formation of z-discharged plasma channel in LIB-fusion device
[IPPJ-601] N82-34255
PLASMA DENSITY
Probe measurements for impurity transport in the scrape-off layer of JIPP T-II
[IPPJ-590] N82-34239
All coated limited experiment in the JIPP T-II Tokamak
[IPPJ-593] N82-34241
Wall material characteristics in reacting plasma modelling
[IPPJ-592] N82-34242
PLASMA DIAGNOSTICS
Experimental and theoretical investigation of microwave and millimeter wave radiation from hollow, rotating, electron beams
[AD-A117896] N82-33625
Short-pulse electron-beam propagation experiments in a controlled-environment chamber
[AD-A116999] N82-34212
Research support for plasma diagnostics on Elmo Bumpy diamagnetic measurements for the electron rings and development of a ferromagnetic resonance magnetometer
[DE82-007245] N82-34259
Thomson scattering on the PRETEXT Tokamak
[DE82-009085] N82-34262
Tokamak confinement experiments
[DE82-009301] N82-34265
Multi-point Thomson scattering
[DE82-014385] N82-34270
Calibration of a diamagnetic diagnostic for stored energy of high-temperature electron annuli in Elmo Bumpy Torus (EBT)
[DE82-015235] N82-34271
PLASMA DRIFT
Low-frequency turbulence, particle and heat transport in the Wisconsin levitated octupole
[DE82-012557] N82-34263
PLASMA EQUILIBRIUM
Average beta value of axially symmetric plasma
[IPPJ-586] N82-34252
Effects of ion-bounce resonances on ballooning-interchange modes
[DE82-014405] N82-34268
PLASMA FOCUS
A scaling law of neutron yield for DT discharge in plasma focus
[IPPJ-600] N82-34254
Model calculations for the explosive generator-driven dense plasma focus
[DE82-008960] N82-34264
PLASMA GENERATORS
Negative-ion-beam generation with the ORNL SITEX source
[DE82-016042] N82-34211
PLASMA GUNS
Model calculations for the explosive generator-driven dense plasma focus
[DE82-008960] N82-34264
PLASMA HEATING
High energy tail production by higher harmonic frequency up to 5 omega ci
[AD-B067129] N82-34250
Propagation characteristics in a magnetized plasma-waveguide near the ion cyclotron frequency
[IPPJ-598] N82-34253
Plasma wave turbulence and particle heating caused by electron beams, radiation and pinches
[AD-A117862] N82-34257
PLASMA INTERACTIONS
Desorption and related phenomena relevant to fusion devices
[IPPJ-AM-22] N82-34234
PLASMA LOSS
Self-consistent analysis of collisional loss in a spatially varying magnetic mirror
[IPPJ-588] N82-34245
PLASMA PINCH
Short-pulse electron-beam propagation experiments in a controlled-environment chamber
[AD-A116999] N82-34212
PLASMA SHEATHS
Model calculations for the explosive generator-driven dense plasma focus
[DE82-008960] N82-34264
PLASMA SPRAYING
Advanced ceramic coating development for industrial/utility gas turbines
[NASA-CR-168852] N82-33494
PLASMA TEMPERATURE
On the thermal stability of coronal loop plasma
[NASA-CR-169347] N82-34327
PLASMA TURBULENCE
Plasma wave turbulence and particle heating caused by electron beams, radiation and pinches
[AD-A117862] N82-34257
Low-frequency turbulence, particle and heat transport in the Wisconsin levitated octupole
[DE82-012557] N82-34263
PLASMA WAVES
Plasma wave turbulence and particle heating caused by electron beams, radiation and pinches
[AD-A117862] N82-34257
Microwave energy coupling in a nitrogen breakdown plasma
[AD-A117900] N82-34258
Detection of nonthermal continuum radiation in Saturn's magnetosphere
[NASA-CR-169231] N82-34326
PLASMA-PARTICLE INTERACTIONS
Low-frequency turbulence, particle and heat transport in the Wisconsin levitated octupole
[DE82-012557] N82-34263
PLASMAGUIDES
Propagation characteristics in a magnetized plasma-waveguide near the ion cyclotron frequency
[IPPJ-598] N82-34253
PLASMAS (PHYSICS)
Effect of an electron beam on the current convective instability
[AD-A117908] N82-33937
Structural changes in plasma membrane under influence of ionizing radiation N82-33993
Plasma wave turbulence and particle heating caused by electron beams, radiation and pinches
[AD-A117862] N82-34257
PLASTIC COATINGS
Fluoropolymer barriers to stress corrosion in optical fibers
[AD-A117346] N82-34224
PLASTIC DEFORMATION
Interaction of heat production, strain rate and stress power in a plastically deforming body under tensile test N82-33746
The analysis of elastic-plastic deformation and stress at finite strain and their evaluation
[AD-A117505] N82-33779
PLASTIC PROPERTIES
Blended elemental titanium alloys
[DE82-012882] N82-33513
The Shock and Vibration Digest, volume 13, no. 10
[AD-A106486] N82-33727
Recent progress in the dynamic plastic behavior of structures, part 3 N82-33728
Elastic/plastic finite element analysis of a single edge-cracked beam subjected to mode 1 tensile loading
[AD-A117622] N82-33773
PLASTICS
Application of In Situ Fiberization for fabrication of improved strain isolation pads and graphite epoxy composites
[NASA-CR-3616] N82-33431
Fracto-emission from polymers
[AD-A116786] N82-33535
Development of effective machining and tooling techniques for Kevlar composite laminates
[AD-A117853] N82-33716
Conversion of waste plastics to fuel oil
[DE82-002454] N82-33873
The 26th AFOSR chemical and atmospheric sciences program review FY81
[AD-A117325] N82-33930
PLATE THEORY
The Shock and Vibration Digest, volume 13, no. 10
[AD-A106486] N82-33727
Recent progress in the dynamic plastic behavior of structures, part 3 N82-33728
Plate vibration research, 1976-1980: Complicating effects N82-33729
Advances and trends in plate buckling research N82-33760
Solution of Von Karman's plate equation with perturbation and series summation N82-33761
Approximate theory for the transverse motion of a two-layered plate. A theoretical model applicable to acoustic scattering from submerged structures with coating layer(s)
[AD-A117034] N82-33767

PLATES (STRUCTURAL MEMBERS)
Research on dynamics of composite and sandwich plates, 1979 - 1981
[AD-A117946] N82-33441
Advances and trends in plate buckling research N82-33760
Mechanics of bimodular composite structures
[AD-A117942] N82-33776

PLATINUM
The adsorption and oxidation of carbon monoxide in strong acid solutions N82-33449

PLUMES
Predictive model for jet engine test cell opacity
[AD-A117585] N82-33397
Study of atmospheric diffusion using LANDSAT
[NASA-CR-169325] N82-33794
Nitrogen oxide transformations in power-plant plumes
[DE82-901847] N82-33897
Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary
[AD-A116794] N82-33925

POINT SOURCES
Study of atmospheric diffusion using LANDSAT
[NASA-CR-169325] N82-33794

POINTS (MATHEMATICS)
Optimization algorithms on random graphs
[AD-A115804] N82-34140

POLAR METEOROLOGY
NORSEX 1979 microwave remote sensing data report
[NASA-CR-165967] N82-33796

POLARIZED ELECTROMAGNETIC RADIATION
Numerical results of the theory of diffraction of radio waves around the surface of the Earth (selected sections)
[AD-A115668] N82-33601

POLARIZED LIGHT
The white light solar corona: An atlas of K-coronameter synoptic charts, August 1980 - September 1981
[PB82-179706] N82-34334

POLLUTION CONTROL
Vapor condensation control of JP-4 emissions from underground storage tanks at March Air Force Base, California
[AD-A117875] N82-33554
An evaluation of 3 wet dust control techniques for face drills
[PB82-177320] N82-33808
Acid rain
[GPO-87-365] N82-33889
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
Preliminary economic analysis of NO sub x flue-gas treatment processes using TVA and EPRI economic premises
[DE82-902223] N82-33895
Indoor pollutants
[PB82-180563] N82-33904

POLLUTION MONITORING
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
Air quality trends in Region 8, 1980 data
[PB82-204074] N82-33910

POLLUTION TRANSPORT
Study of atmospheric diffusion using LANDSAT
[NASA-CR-169325] N82-33794
Acid rain
[GPO-87-365] N82-33889
Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary
[AD-A116794] N82-33925
Environmental assessment model for shallow land disposal of low-level radioactive wastes
[DE82-001830] N82-34214

POLYACETYLENE
Compatibility of polyacetylene with lithium battery materials
[AD-A117684] N82-33837

POLYAMIDE RESINS
Development of effective machining and tooling techniques for Kevlar composite laminates
[AD-A117853] N82-33716
Analyses of beams constructed of nonlinear materials having different behavior in tension and compression
[AD-A117944] N82-33777

POLYATOMIC MOLECULES
Research investigation directed toward extending the useful range of the electromagnetic spectrum
[AD-A117626] N82-33618
Research and development services: Methods development
[AD-A117643] N82-34302

POLYETHYLENES
The effects of processing conditions on the reliability of cross-linked polyethylene cable insulation
[DE82-011712] N82-33543

POLYIMIDE RESINS
LARC-TPI: A multi-purpose thermoplastic polyimide
[NASA-TM-84516] N82-33530

POLYMER CHEMISTRY
A method of polymer design and synthesis for selective infrared energy absorption
[AD-A117485] N82-33540
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542

POLYMER MATRIX COMPOSITES
Dynamic mechanical analysis and organization/storage of data for polymetric materials
[NASA-CR-166413] N82-33527
Polymer concrete and its application to bridge deck maintenance
[PB82-177940] N82-33579

POLYMER PHYSICS
Finite element modeling of nonisothermal polymer flows
[NASA-CR-169355] N82-33525
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542

POLYMERIC FILMS
Rapid quenching effects in PVC films
[NASA-CR-169350] N82-33524
Waterborne polymeric films
[AD-A116857] N82-33532
Method of evaluating the thermal stability of the pyroelectric properties of polyvinylidene fluoride effects of poling temperature and field
[AD-A117388] N82-33536
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium
[AD-A117814] N82-33541

POLYMERIZATION
Laser induced polymerization reactions in solid propellant binders
[AD-A117158] N82-33548

POLYMERS
Quantum chemical calculations for polymers and organic compounds
[NASA-CR-166414] N82-33528

POLYMETHYL METHACRYLATE
Cracking and toughness of concrete and polymer-concrete dispersed with short steel wires
[PB82-180589] N82-33578

POLYNOMIALS
Accurate monotonicity-preserving cubic interpolation
[DE82-009964] N82-34157
Structure and Smith-MacMillan form of a rational matrix at infinity
[PB82-178625] N82-34159

POLYPEPTIDES
Viscosity dependence of the rates of diffusional processes
[NASA-CR-166394] N82-33982

POLYPHENYLS
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542

POLYSTYRENE
Compressibility of colloids. 1: Compressibility studies of aqueous solutions of amphibilic polymers and their adsorbed state on Polystyrne latex dispersions by ultrasonic velocity measurements
[AD-A117416] N82-33538

POLYURETHANE RESINS
Waterborne polymeric films
[AD-A116857] N82-33532
Ultraviolet-radiation-curable paints
[DE82-015717] N82-33545
Analytical and experimental investigations of bimodular composite beams
[AD-A117945] N82-33778

POLYVINYL CHLORIDE
Rapid quenching effects in PVC films
[NASA-CR-169350] N82-33524

POLYVINYL FLUORIDE
Method of evaluating the thermal stability of the pyroelectric properties of polyvinylidene fluoride effects of poling temperature and field
[AD-A117388] N82-33536

POPULATIONS
Pulsed excitation and collisional processes
[AD-A116937] N82-33707
Ranking and subset selection procedures for exponential populations with Type-1 and Type-2 censored data
[AD-A115821] N82-34161

POROSITY
Mechanisms affecting mass transfer in fuel cells
[DE82-013431] N82-33876

POROUS MATERIALS
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium
[DE82-009289] N82-33673

PORTABLE EQUIPMENT
High power transportable VLF transmitter facility
[AD-A117419] N82-33623

POSITION (LOCATION)
Development and test of a digital/optical linear position transducer
[AD-A117918] N82-34231

POSITION ERRORS
Effect of satellite orbit error on computed coordinates of Doppler receivers
[AD-A116894] N82-33416

POSITIONING
Low noise lead screw positioner
[NASA-CASE-NPO-15617-1] N82-33681

POSITRON ANNIHILATION
Positron annihilation spectroscopy with magnetically analyzed beams
[NASA-TM-84535] N82-33435

POSTFLIGHT ANALYSIS
Mission operation report. Space Shuttle program: STS-4 postflight medical operations report
[NASA-TM-84854] N82-34001

POWER EFFICIENCY
Family of airfoil shapes for rotating blades — for increased power efficiency and blade stability
[NASA-CASE-LAR-12843-1] N82-33372

POWER PLANTS
Nitrogen oxide transformations in power-plant plumes
[DE82-901847] N82-33897

POWER SPECTRA
The mean and variance of skywave radar sea-echo power spectra for discrete ionospheric multipath
[PB82-174236] N82-33631
Turbulence analysis by use of the fast Fourier transform — for calculation of impact on missile systems
[AD-A117157] N82-33953
Spatial distributions of phytoplankton: Limitations of power spectrum techniques N82-33968

POWER SUPPLIES
Framework for power-network analysis
[DE82-012724] N82-33658
Evaluation of underground dc transmission systems
[DE82-012312] N82-33660
Intermediate photovoltaic system application experiment operational performance. Volume 6: Newman Power Station, El Paso, Texas
[DE82-008483] N82-33846
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory
[DE82-010867] N82-33866

POWER TRANSMISSION
Evaluation of underground dc transmission systems
[DE82-012312] N82-33660

POWERED LIFT AIRCRAFT
Analysis of several glidepath and speed control autopilot concepts for a powered lift STOL aircraft
[NASA-TM-84282] N82-33400

PRECIPITATION (METEOROLOGY)
Cloud and precipitation particle size spectra
[AD-A117457] N82-33956
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981
[PB82-176967] N82-33966
Cloud physics studies in SCPP(Sierra Cooperative Pilot Project) during 1980-1981
[PB82-174210] N82-33967

PRECIPITATION HARDENING
Studies on age-hardening in spinodally modulated alloys, experimental and theoretical
[DE82-007957] N82-33506

PRECISION
High precision tidal gravity
[AD-A116941] N82-33934

PREDICTION ANALYSIS TECHNIQUES
Seismic waves N82-33563
A two-component rain model for the prediction of attenuation and diversity improvement
[NASA-CR-169198] N82-33592

PRELAUNCH SUMMARIES
INTELSAT V-E(F-5)
[NASA-TM-84857] N82-33413

PREPROCESSING
Preprocessing techniques in transient analysis
[AD-A116860] N82-34143

PRESSURE
Explosive-powder compaction system
[DE82-003134] N82-33556

New pressure test for determining coefficient of permeability of rock masses
[AD-A116982] N82-33927
PRESSURE DROP
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672
PRESSURE MEASUREMENT
The Shock and Vibration Digest, volume 14, no. 2
[AD-A111521] N82-33564
Acoustic impedance measurement methods N82-33565
PRESSURE SENSORS
Design and evaluation of a pressure sensor for high temperature nuclear application
[EGG-2135] N82-33682
PRESTRESSING
Program package for nonlinear analysis of reinforced concrete structures
[PB82-204744] N82-33585
PREVENTION
Investigation of aircrew protection during emergency escape at dynamic pressures up to 1600 Q
[AD-A117552] N82-33359
PRIMARY BATTERIES
High energy surfuryl chloride batteries
[AD-A117106] N82-33833
PRIMERS (COATINGS)
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium
[AD-A117814] N82-33541
PRINTED CIRCUITS
Screening tests of conformally-coated printed wiring boards
[DE82-012873] N82-33656
PROBABILITY DENSITY FUNCTIONS
Density measurement in air with saturable absorbing seed gas
[NASA-CR-169420] N82-33919
Atlantic coast water-level climate
[AD-A117147] N82-33951
Quantiles, parametric-select density estimations, and bi-information parameter estimators
[AD-A117460] N82-34153
PROBABILITY DISTRIBUTION FUNCTIONS
Atlantic coast water-level climate
[AD-A117147] N82-33951
Optimal grouping, spacing, stratification and piecewise constant approximation
[AD-A117023] N82-34168
A quantile domain perspective on the relationships between optimal grouping, spacing and stratification problems
[AD-A116944] N82-34172
Autoregressive spectral estimation and functional inference
[AD-A117113] N82-34173
PROBABILITY THEORY
Probabilistic environmental model for solid rocket motor life prediction
[AD-A117651] N82-33427
A model of subjective probabilities from small groups N82-34054
Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-34067
PROBLEM SOLVING
Elliptic equation solvers for NORDA ocean models and a study of equatorial ocean dynamics
[AD-A117374] N82-33977
Vectorized sparse elimination
[AD-A117112] N82-34094
An O(NlogN) planar travelling salesman heuristic based on spacefilling curves
[AD-A115357] N82-34136
Moving finite elements in 2-D
[AD-A117078] N82-34142
Performance bounds for binary testing with arbitrary weights
[AD-A117493] N82-34154
Structure and Smith-MacMillan form of a rational matrix at infinity
[PB82-178625] N82-34159
PROCESS CONTROL (INDUSTRY)
Voltammetric studies of a multipurpose membrane electrode N82-33455
Computer-aided design, drawing and manufacturing system for dies and molds
[NRC/CNR-TT-2030] N82-34101
PROCESS HEAT
Development of a direct-absorption high-temperature gas receiver
[DE82-010168] N82-33838
Optimal staging of endoreversible heat engines
[DE82-900742] N82-33841
PROCESSES
Containerless processing technology analysis
[NASA-CR-170624] N82-33430
PROCUREMENT MANAGEMENT
Improving software quality assurance methods
[AD-A116980] N82-34109
PRODUCT DEVELOPMENT
BNL neutral-beam development group
[DE82-008852] N82-34266
PRODUCTION ENGINEERING
Containerless processing technology analysis
[NASA-CR-170624] N82-33430
Basic techniques in availability engineering
[DE82-903666] N82-34298
PRODUCTION MANAGEMENT
Production lot sizing and the power of 2
[AD-A116929] N82-34292
PRODUCTION PLANNING
Production lot sizing and the power of 2
[AD-A116929] N82-34292
Technology transfer in New Mexico
[GPO-85-343] N82-34309
PRODUCTIVITY
World mineral statistics 1975-79: Production, exports, imports
[PB82-172842] N82-33811
United Kingdom mineral statistics 1980
[PB82-172362] N82-33817
PROGRAM VERIFICATION (COMPUTERS)
Proof testing of a structural plate pipe with varying bedding and backfill parameters. Section 7, volume 1: Finite element analysis program modification and analysis of zone 2
[PB82-201526] N82-33587
XERROR: The SLATEC error-handling package
[DE82-015494] N82-34116
Nonalgebraic symbol manipulators for use in scientific and engineering modeling: Introducing the FORSE (FORTRAN Symbol Expander)
[DE82-009818] N82-34118
International Business Machines Corporation, IBM Series/1 COBOL 5719-CB7 version 2 Level 0 (COBOL technical report)
[PB82-155342] N82-34120
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEP, PRPQ P82648 Version 2 Level 0 (validation summary report)
[PB82-155359] N82-34121
International Business Machines Corporation, IBM Series/1 COBOL 5719-CB7 version 2 level 0 (validation summary report)
[PB82-155367] N82-34122
International Business Machines Corporation, IBM Series/1 COBOL (EDX)5719-CB5 version 2 level 0 (validation summary report)
[PB82-155375] N82-34123
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEL, PRPQ P82647 version 2 level 0 (COBOL technical report)
[PB82-155383] N82-34124
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEL, PRPQ P82647 version 2 level 0 (validation summary report)
[PB82-155391] N82-34125
Systems performance measurement and analysis
[DE82-009067] N82-34126
PROGRAMMERS
Experimental investigation of programming complexity in COBOL
[AD-A116811] N82-34108
PROGRAMMING LANGUAGES
A simulation language approach to structural interaction problems N82-33758
A summary discussion of CONLAN
[AD-A117461] N82-34113
PROJECT PLANNING
Figures of merit: Use and interpretation in evaluating program alternatives
[AD-A117233] N82-34295
PROJECTILES
Aerodynamic loads on a ball-obturated tubular projectile
[AD-A115756] N82-33349
Wind-tunnel drag measurements of a ball-obturated tubular projectile
[AD-A117268] N82-33351
Computations of projectile Magnus effect at transonic velocities
[AD-A117313] N82-33353
Navier-Stokes computations for conventional and hollow projectile shapes at transonic velocities
[AD-A116866] N82-33355
PROP-FAN TECHNOLOGY
Advanced turboprop testbed systems study
[NASA-CR-167895] N82-33375
PROPELLANT BINDERS
Laser induced polymerization reactions in solid propellant binders
[AD-A117158] N82-33548
PROPELLANT GRAINS
Surveillance report. Stage 1: Dissected motors. Phase 13: Propellant and component testing
[AD-A117604] N82-33426
PROPELLANT STORAGE
Explosives instrumentation group trial 6/77-propellant fire trials (series 2)
[AD-A117695] N82-33555
PROPELLER BLADES
Impact of advanced propeller technology on aircraft/mission characteristics of several general aviation aircraft
[NASA-CR-167984] N82-33347
PROPULSION SYSTEM CONFIGURATIONS
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889-VOL-1] N82-33424
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889-VOL-2] N82-33425
PROPULSION SYSTEM PERFORMANCE
AFOSR Research Meeting on Diagnostics of Reacting Flow
[AD-A117075] N82-33668
On the road performance tests of electric test vehicle for correlation with road load simulator
[NASA-TM-82900] N82-33829
PROTECTIVE CLOTHING
Effectiveness of ice (water) packets vests in reducing heat stress
[AD-A117864] N82-34021
Cold weather goggles. Part 3: Resistance to fogging
[AD-A115898] N82-34078
Microclimate cooling for combat vehicle crewmen
[AD-A117156] N82-34083
PROTECTIVE COATINGS
Advanced ceramic coating development for industrial/utility gas turbines
[NASA-CR-169852] N82-33494
Overlay metallic-cermet alloy coating systems --- for gas turbine engines
[NASA-CASE-LEW-13639-1] N82-33522
Waterborne polymeric films
[AD-A116857] N82-33532
Arc-sprayed metals for structural electromagnetic shielding
[AD-A117673] N82-33629
PROTEIN METABOLISM
Viscosity dependence of the rates of diffusional processes
[NASA-CR-166394] N82-33982
New data on metabolism and action mechanism of mycotoxins N82-33989
PROTON BEAMS
Formation of z-discharged plasma channel in LIB-fusion device
[IPPJ-601] N82-34255
PROTON-PROTON REACTIONS
High energy hadron-hadron collisions
[DE82-011255] N82-34206
PROTONS
Central production and small-angle elastic scattering in the valon model
[DE82-008367] N82-34205
PROTOTYPES
Design and evaluation of a pressure sensor for high temperature nuclear application
[EGG-2135] N82-33682
PROVING
United Computing Systems, Inc. CYBER 730, CDC COBOL 5.3 Level 528
[PB82-169509] N82-34100
PROXIMITY
Evaluation of SMART sensor displays for multidimensional precision control of Space Shuttle remote manipulator N82-34074
PSYCHOPHYSICS
A theory of diagnostic interference. 1: Imagination and the psychophysics of evidence
[AD-A115940] N82-34026
PUBLIC HEALTH
Potential health and environmental effects of the fluidized-bed combustion of coal
[DE82-014389] N82-33900
Potential health and environmental effects of light-duty diesel vehicles, 2
[DE82-014390] N82-33901
Formaldehyde and other aldehydes
[PB82-180498] N82-33909

PULMONARY FUNCTIONS
Respiratory adaptation to acute metabolic acidosis in goats with ablated carotid bodies
[AD-A116657] N82-33984
An apparatus for the measurement of pulmonary function in unanesthetized small animals
[AD-A114938] N82-33985
PULSE COMMUNICATION
Measured performance of a delay lock tracking loop when noise power exceeds signal power
[AD-A116797] N82-33606
Digital communications techniques and equipment for law enforcement use
[PB82-195496] N82-33632
PULSE GENERATORS
Pinch-reflex-diode scaling on the aurora pulser
[AD-A116055] N82-33638
PULSED LASERS
Micom program in light control by light
[AD-A117159] N82-33706
PULSES
Advanced nondestructive evaluation (ultrasonic pulser/receiver technology)
[AD-A117841] N82-33724
PUMPS
Development of an energy test method for a dedicated water-heating pump
[PB82-170069] N82-33575
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
Design description of the Tangaye Village photovoltaic power system
[NASA-TM-82917] N82-33828
PURIFICATION
Development of a solid absorption process for removal of sulfur from fuel gas
[DE82-012996] N82-33484
PURSUIT TRACKING
Modeling of human operator dynamics in simple manual control utilizing time series analysis --- tracking (position)
N82-34038
PYROELECTRICITY
Method of evaluating the thermal stability of the pyroelectric properties of polyvinylidene fluoride effects of poling temperature and field
[AD-A117388] N82-33536
PYROLYSIS
Progress in the entrained-flow, fast-ablative pyrolysis of biomass
[DE82-009911] N82-33478
Conversion of waste plastics to fuel oil
[DE82-002454] N82-33873
Ultraviolet enhanced deposition from pentacarbonyl-iron on gallium arsenide, quartz, and sapphire
[AD-A116800] N82-34278

Q

QUADRATIC PROGRAMMING
Users guide for SOL/QPSOL: A FORTRAN package for quadratic programming
[AD-A117607] N82-34114
QUADRATURES
A simple quadrature formula from Simpson's rule applicable for odd or even n
[AD-A116867] N82-34148
QUADRUPOLES
New viewpoints in mass filter design
[AD-A117295] N82-33468
QUALITY CONTROL
Glass-to-metal seal quality
[AD-A117598] N82-33718
Improving software quality assurance methods
[AD-A116980] N82-34109
QUANTILES
Optimal grouping, spacing, stratification and piecewise constant approximation
[AD-A117023] N82-34168
A quantile domain perspective on the relationships between optimal grouping, spacing and stratification problems
[AD-A116944] N82-34172
QUANTITATIVE ANALYSIS
Determination of carbon monoxide in air by triple quadrupole mass spectrometry
[AD-A117443] N82-33470
QUANTUM ELECTRONICS
Utilization of quantum distribution functions for ultra submicron device transport
[AD-A117433] N82-34280
QUANTUM MECHANICS
Quantum chemical calculations for polymers and organic compounds
[NASA-CR-166414] N82-33528
QUANTUM THEORY
Inelastic strong interactions at high energies
[DE82-007984] N82-34215
Mean field theory for lattice gauge systems with fermions
[DE82-700785] N82-34289
QUARKS
Inelastic strong interactions at high energies
[DE82-007984] N82-34215
QUENCHING (COOLING)
Rapid quenching effects in PVC films
[NASA-CR-169350] N82-33524

R

RADAR
Output tube emission characteristics of operational radars
[PB82-193426] N82-33633
RADAR ECHOES
The mean and variance of skywave radar sea-echo power spectra for discrete ionospheric multipath
[PB82-174236] N82-33631
RADAR IMAGERY
Active microwave remote sensing research program plan. Recommendations of the Earth Resources Synthetic Aperture Radar Task Force --- application areas: vegetation canopies, surface water, surface morphology, rocks and soils, and man-made structures
[NASA-CR-167726] N82-33596
RADAR RESOLUTION
A functional model for the closely spaced object resolution process
[AD-A116890] N82-34150
RADAR SCANNING
Underground scanning with an impulse radar
[DE82-015495] N82-33630
RADAR SCATTERING
Techniques for Doppler spectral estimation of HF radar signals backscattered from high latitude ionosphere irregularities
[AD-A116838] N82-33613
RADAR TARGETS
Tracking closely spaced multiple sources via spectral-estimation techniques
[AD-A116967] N82-33607
RADAR TRACKING
Improving conflict alert performance using moving target detector data
[AD-A117691] N82-33370
Tracking closely spaced multiple sources via spectral-estimation techniques
[AD-A116967] N82-33607
Memory and computational requirements for tracking in the advanced computer system
[AD-A117666] N82-33619
RADIANT FLUX DENSITY
The application of US upper-wind data in one design of tethered wind energy systems
[DE82-012880] N82-33962
RADIATION
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994
RADIATION DAMAGE
Structural changes in plasma membrane under influence of ionizing radiation N82-33993
Radiation damage and annealing effects studies of silicon-implanted gallium arsenide
[AD-A117884] N82-34284
RADIATION DOSAGE
Dosimetric and behavioral analysis of microwave-drug synergistic effects on operant behavior in the rat
[AD-A115115] N82-33986
Tables of energy-deposition distributions in water phantoms irradiated by point-monodirectional electron beams with energies from 1 to 60 MeV, and applications to broad beams
[PB82-178716] N82-34023
RADIATION EFFECTS
Effects of ionization on silicate glasses
[DE82-012595] N82-33544
Environmental assessment model for shallow land disposal of low-level radioactive wastes
[DE82-001830] N82-34214
Theoretical studies of radiation effects in composite materials for space use --- graphite-epoxy composites
[NASA-CR-3618] N82-34335
RADIATION HAZARDS
Performance evaluation of RF electric and magnetic field measuring instruments
[PB82-195009] N82-33694
RADIATIVE TRANSFER
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899
A tutorial solution to scattering of radiation in a thin atmosphere bounded below by a diffusely reflecting, absorbing surface
[NASA-TP-2077] N82-33918
RADIO ALTIMETERS
SEASAT satellite radar altimetry data processing system
[AD-A115972] N82-33797
Modeling and adjusting global ocean tides using SEASAT altimeter data
[AD-A115841] N82-33972
RADIO ASTRONOMY
Shuttle VLBI experiment. Technical working group summary report
[NASA-TM-82491] N82-34315
RADIO ATTENUATION
A two-component rain model for the prediction of attenuation and diversity improvement
[NASA-CR-169198] N82-33592
Numerical results of the theory of diffraction of radio waves around the surface of the Earth (selected sections)
[AD-A115668] N82-33601
RADIO DIRECTION FINDERS
Methods for 2-beam array processing
[AD-A116880] N82-33605
RADIO FREQUENCIES
Output tube emission characteristics of operational radars
[PB82-193426] N82-33633
Performance evaluation of RF electric and magnetic field measuring instruments
[PB82-195009] N82-33694
Hyperthermia heating apparatus --- cancer therapy
[NASA-CASE-NPO-14549-2] N82-33996
RADIO FREQUENCY DISCHARGE
Continuously-tunable high-repetition rate RF-excited CO2 waveguide laser
[NDRC/PUBL-82/1002] N82-33695
RADIO FREQUENCY HEATING
High energy tail production by higher harmonic frequency up to 5 omega ci
[AD-B067129] N82-34250
RADIO NAVIGATION
Integrated systems of automatic radio equipment
[AD-A115870] N82-33602
RADIO TRANSMISSION
Shuttle STS-2 mission communication systems RF coverage and performance predictions. Volume 1: Ascent
[NASA-TM-84853] N82-33594
RADIO TRANSMITTERS
High power transportable VLF transmitter facility
[AD-A117419] N82-33623
RADIO WAVES
A survey of ionospheric models: A preliminary report on the development of an ionospheric model thesaurus and users guide
[AD-A117659] N82-33935
Biological Effects of Nonionizing Electromagnetic Radiation: A digest of current literature, July through September 1981, volume 6, number 1
[PB82-176504] N82-34024
RADIOACTIVE WASTES
Underground scanning with an impulse radar
[DE82-015495] N82-33630
Symposium on Environmental Technology and Management
[PB82-185273] N82-33902
Field and in-situ rock-mechanics testing manual
[DE82-015762] N82-33940
Environmental assessment model for shallow land disposal of low-level radioactive wastes
[DE82-001830] N82-34214
Three-dimensional thermal analysis for a conceptual high-level waste repository in welded tuff
[DE82-015503] N82-34217
RADIOGRAPHY
Comparison between shear wave ultrasonic examination and radiographic examination of some austenitic stainless steel pipe welds
[PB82-207267] N82-33584
RADIOLOGY
Hyperthermia heating apparatus --- cancer therapy
[NASA-CASE-NPO-14549-2] N82-33996
Some computer applications and digital image processing in nuclear medicine N82-34000

Tables of energy-deposition distributions in water phantoms irradiated by point-monodirectional electron beams with energies from 1 to 60 MeV, and applications to broad beams
[PB82-178716] N82-34023

RADIOMETERS
AVHRR measurements of atmospheric aerosols over oceans
[PB82-172115] N82-33945

RADIOMETRIC RESOLUTION
A functional model for the closely spaced object resolution process
[AD-A116890] N82-34150

RADIOSONDES
Methods and techniques of experimental research on the atmosphere (selected articles)
[AD-A117570] N82-33933

RAIN
A two-component rain model for the prediction of attenuation and diversity improvement
[NASA-CR-169198] N82-33592
An empirical model for near millimeter wave snow extinction and backscatter
[AD-A117350] N82-33610
The multi-parameter remote measurement of rainfall
[NASA-TM-83971] N82-33947
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 2: The FACE-2 confirmatory radar rainfall and covariate data sets
[PB82-172131] N82-33963

RAIN GAGES
The multi-parameter remote measurement of rainfall
[NASA-TM-83971] N82-33947

RAMAN SPECTROSCOPY
Raman spectroscopy for in-situ monitoring of electrode processes
[DE82-014909] N82-33486

RANDOM ACCESS MEMORY
Advanced on-board signal processor gallium arsenide memory
[AD-A117151] N82-34091

RANDOM VARIABLES
Central limit theorems in the area of large deviations for some dependent random variables
[AD-A117714] N82-34155

RANDOM VIBRATION
Some vibrating membrane equations for the linear estimation of two dimensional isotropic random fields
[AD-A116959] N82-33770

RANGE (EXTREMES)
A summary of the results of a study of acoustic bottom interaction in a range dependent environment
[AD-A116891] N82-33970

RANK TESTS
Edgeworth expansions in statistics: A brief review
[AD-A117061] N82-34165
On the correlation of a group of rankings with an external ordering relative to the internal concordance
[AD-A117232] N82-34170

RANKINE CYCLE
Residual energy application program: Utilization of high-temperature waste heat by means of Rankine-cycle engines. A technical summary
[DE82-010376] N82-33839
Energy storage using phase-change materials for active solar heating and cooling: An evaluation of future research and development direction
[DE82-014656] N82-33857

RANKING
Ranking and subset selection procedures for exponential populations with Type-1 and Type-2 censored data
[AD-A115821] N82-34161
A concept of negative dependence using stochastic ordering
[AD-A116888] N82-34164
On the correlation of a group of rankings with an external ordering relative to the internal concordance
[AD-A117232] N82-34170
NOMBAS: A Bayesian procedure for selecting the greatest mean
[AD-A117611] N82-34178

RARE EARTH COMPOUNDS
Charge penetration effects in rare-earth crystal fields
[AD-A117494] N82-34283

RARE GASES
Microwave spectroscopy of weakly bound molecular complexes N82-33451
Low noise lead screw positioner
[NASA-CASE-NPO-15617-1] N82-33681
Research on sources of gas phase metastable atoms and molecules
[AD-A117672] N82-34201

RATINGS
An analytical prediction of pilot ratings utilizing human pilot model N82-34051
Pilot opinions of sampling effects in lateral-directional control N82-34053

RAY TRACING
Ray tracing methods for calculation of atmospheric refraction
[AD-A116766] N82-33928

RAYLEIGH SCATTERING
Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary
[AD-A116794] N82-33925

RAYLEIGH WAVES
Investigation of the Rayleigh critical angle phenomenon for the characterization of surface properties
[AD-A117264] N82-33723

RAYLEIGH-RITZ METHOD
Application of the reduced basis method to nonlinear transient thermal analysis N82-33743

REACTION KINETICS
Dissociative adsorption of CO2 on oxidized and reduced Pt/TiO2
[AD-A117890] N82-33473
Selective metal-ion extraction for multiple-ion liquid-liquid exchange reactions
[DE82-011721] N82-33474
Solvent Refined Coal (SRC) Process. Effect of mixing energy on hydrogen reaction rates in SRC-11 reactors
[DE82-008447] N82-33481
Study of molecular collision dynamics for chemical laser systems
[AD-A117938] N82-33709

REACTION PRODUCTS
The problem of ensuring a specified molecular weight in the process of emulsion polymerization
[NRC/CNR-TT-2026] N82-33529

REACTOR DESIGN
Fusion engineering device. Volume 1: Mission and program summary
[DE82-008931] N82-34267
Fusion engineering device. Volume 4: Physics basis and physics R and D requirements
[DE82-008934] N82-34275
Fusion engineering device. Volume 5: Technology R and D requirements for construction
[DE82-008936] N82-34276

REACTOR TECHNOLOGY
Fusion engineering device. Volume 1: Mission and program summary
[DE82-008931] N82-34267
Suppression of plasma formation in waveguide antennas for lower-hybrid heating
[DE82-014392] N82-34269
Fusion engineering device. Volume 3: Test plan
[DE82-008933] N82-34274

REAL TIME OPERATION
Applying photogrammetry to real time collection of digital image data
[AD-A116770] N82-33687
Real-time control of GMA welding
[PB82-204660] N82-33721
GMA welding experiments using real-time control
[PB82-204652] N82-33722
Does man always close the loop in trying to pilot a large ship? N82-34068
Experimental evaluation of the concept of supervisory manipulation N82-34073

RECEIVERS
Prototype design and initial test evaluation of a Global Positioning System Time Transfer Receiver (GPS TTR)
[NASA-TM-84721] N82-33364
Advanced nondestructive evaluation (ultrasonic pulser/receiver technology)
[AD-A117841] N82-33724

RECHARGING
Short-circuit formation during NiCd cell reversal
[AD-A117912] N82-33836

RECOVERY
Alternative employment concepts for Remotely Piloted Vehicle (RPV) FLIR/TV mission payload
[AD-A117877] N82-33379

RECTANGULAR PLATES
Advances and trends in plate buckling research N82-33760

RECTENNAS
A FORTRAN program for rectangular microstrip antennas
[AD-A116952] N82-33612

RECYCLING
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N82-33526
Conversion of waste plastics to fuel oil
[DE82-002454] N82-33873
Evaluation of natural gas molten carbonate fuel cell power plants
[PB82-181272] N82-33881

RED GIANT STARS
Evidence for extended chromospheres surrounding red giant stars
[NASA-CR-169349] N82-34316

REDOX CELLS
Chemical and electrochemical behavior of the Cr(3)/Cr(2) half cell in the NASA Redox Energy Storage System
[NASA-TM-82913] N82-33463

REDUCTION (CHEMISTRY)
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472

REDUNDANCY
Comparing coherent systems
[AD-A116813] N82-34162

REENTRY SHIELDING
Method for repair of thin glass coatings --- on space shuttle orbiter tiles
[NASA-CASE-KSC-11097-1] N82-33520

REFINING
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N82-33526
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil, part 5
[AD-A117438] N82-33551
Sampling and measurement of particulate emissions from refinery installations
[PB82-174665] N82-33905
Sampling of liquid effluents from refineries
[PB82-174657] N82-33906

REFLECTION
The aerospace long-path multiple reflection cell facility
[SD-TR-82-60] N82-34218
The shock front rise time in water
[AD-A117426] N82-34228

REFLECTION NEBULAE
Observations of the reflection nebula NGC 7023 at 2.2 microns N82-34321

REFRACTION
Estimates of crustal transmission losses using MLM array processing
[AD-A117278] N82-33929

REFRACTIVITY
Calculation on optical effect of matter from first principles using group theoretical techniques
[AD-A117310] N82-34223

REFRACTORY COATINGS
Method for repair of thin glass coatings --- on space shuttle orbiter tiles
[NASA-CASE-KSC-11097-1] N82-33520

REFRACTORY MATERIALS
Dynamic mechanical analysis and organization/storage of data for polymetric materials
[NASA-CR-166413] N82-33527
LARC-TPI: A multi-purpose thermoplastic polyimide
[NASA-TM-84516] N82-33530
Development of materials for open cycle MHD
[DE82-008777] N82-34261

REGENERATION (ENGINEERING)
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893

REGRESSION ANALYSIS
TRACALS evaluation report. Special report: A procedure for RTT position improvement using linear regression analysis of glide slope structure
[AD-A115926] N82-33365
Measuring the fracture dimensions of empirical cartographic curves
[AD-A117498] N82-33804
Extensions of some models for positive-valued time series
[AD-A115754] N82-34138
Efficient multichannel autoregressive modeling in time and frequency domain
[AD-A115752] N82-34139
Robust regression procedures for predictor variable outliers
[AD-A117022] N82-34167
Simultaneous confidence bands for autoregressive spectra
[AD-A117072] N82-34176

REINFORCEMENT (STRUCTURES)
Strength diagrams of fibrous composites with unidirectional structure
[NASA-TM-76975] N82-33433
Program package for nonlinear analysis of reinforced concrete structures
[PB82-204744] N82-33585
Durability of reinforced concrete beams exposed to marine environment
[AD-A117284] N82-33768

REINFORCING FIBERS
Application of In Situ Fiberization for fabrication of improved strain isolation pads and graphite epoxy composites
[NASA-CR-3616] N82-33431
RELATIVISTIC EFFECTS
Quantum chemical calculations for polymers and organic compounds
[NASA-CR-166414] N82-33528
RELATIVISTIC ELECTRON BEAMS
Electron drift in a linear magnetic wiggler with an axial guide field
[AD-A115739] N82-33700
Formation of relativistic electron beam rings in a conducting cavity
[IPPJ-583] N82-34237
Evolution of ring current formed by relativistic electron beam injection into a charge but not current neutralizing plasma
[IPPJ-576] N82-34247
RELATIVISTIC PARTICLES
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic paricles
[NASA-CR-169416] N82-34197
RELATIVISTIC THEORY
Inelastic interactions of 4.5 GeV/c protons with emulsion nuclei not accompanied by relativistic charged particles
[DE82-701020] N82-34207
RELAXATION (MECHANICS)
Research in structural and solid mechanics, 1982
[NASA-CP-2245] N82-33739
A semi-implicit dynamic relaxation algorithm for static nonlinear structural analysis N82-33740
RELAXATION (PHYSIOLOGY)
Ventilatory responses to exercise while eliciting the relaxation response
[AD-A115102] N02-34015
RELEASING
TMA chemical release payloads for stratospheric wind measurements auroral E program and related programs
[AD-A115832] N82-33921
RELIABILITY
Reliability, Availability, Maintainability Data Tracking Plan improved GUARDRAIL 5
[AD-A117933] N82-33378
RELIABILITY ANALYSIS
Comparing coherent systems
[AD-A116813] N82-34162
RELIABILITY ENGINEERING
Bayes adaptive estimation of the point of shift to the wear-out phase of reliability systems
[AD-A117865] N82-33725
Stochastic availability of a repairable system with an age and maintenance dependent failure rate
[AD-A116932] N82-34294
REMOTE CONTROL
Principles of the radio control of pilotless objects (selected chapters)
[AD-A117547] N82-33377
REMOTE MANIPULATOR SYSTEM
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) laboratory test results
[AD-A114073] N82-34012
A comparison of control modes for time-delayed remote manipulation N82-34072
Evaluation of SMART sensor displays for multidimensional precision control of Space Shuttle remote manipulator N82-34074
Computer graphic representation of remote environment using position tactile sensors
[AD-A116912] N82-34111
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 1: Study results
[NASA-CR-165975] N82-34129
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation, volume 2, part 1. Appendix A: Software documentation
[NASA-CR-165976] N82-34130
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 2, Part 2: Appendixes B, C, D and E
[NASA-CR-165977] N82-34131
REMOTE SENSING
NORSEX 1979 microwave remote sensing data report
[NASA-CR-165967] N82-33796
Analysis of remote sensing data collected for detection and mapping of oil spills: Reduction and analysis of multi-sensor airborne data of the NASA Wallops oil spill exercise of November 1978
[NASA-CR-165886] N82-33891
Aeromagnetic detection and definition of seamounts
[AD-A117153] N82-33971
REMOTE SENSORS
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
The multi-parameter remote measurement of rainfall
[NASA-TM-83971] N82-33947
REMOTELY PILOTED VEHICLES
Principles of the radio control of pilotless objects (selected chapters)
[AD-A117547] N82-33377
Alternative employment concepts for Remotely Piloted Vehicle (RPV) FLIR/TV mission payload
[AD-A117877] N82-33379
Motor technology for electric Remotely Piloted Vehicle (RPV)
[AD-A117732] N82-33651
REPORTS
Survey of reader preferences concerning the format of NASA technical reports
[NASA-TM-84502] N82-34300
RESCUE OPERATIONS
A pilot study of human factors in SAR
[AD-A117917] N82-34087
Preliminary assessment of US Coast Guard Short Range Recovery (SRR) Forward Looking Infrared (FLIR) system small target detection performance
[AD-A117916] N82-34230
RESEARCH
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil, part 5
[AD-A117438] N82-33551
Energy laboratory data and model directory
[PB82-180274] N82-33884
The 26th AFOSR chemical and atmospheric sciences program review FY81
[AD-A117325] N82-33930
RESEARCH AND DEVELOPMENT
Recent progress in VSTOL technology
[NASA-TM-84238] N82-33334
An assessment of the impact of the Department of Defense very high speed integrated circuit program
[AD-A117459] N82-33646
Identification of energy conservation research opportunities: A review and synthesis of the literature
[DE82-015028] N82-33875
Analysis of NASA's fiscal year 1983 budget request for research and development to determine the amount that supports DOD's programs
[B-207165] N82-34307
Major science and technology issues
[PAD-81-35] N82-34310
RESEARCH FACILITIES
Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system
[AD-A117141] N82-33407
RESEARCH MANAGEMENT
AFOSR Research Meeting on Diagnostics of Reacting Flow
[AD-A117075] N82-33668
Figures of merit: Use and interpretation in evaluating program alternatives
[AD-A117233] N82-34295
A system for assessing user response to NAVPERRANDCEN RDT/E products
[AD-A117719] N82-34297
Research and development services: Methods development
[AD-A117643] N82-34302
Major science and technology issues
[PAD-81-35] N82-34310
The Department of Defense statement on the science and technology program by Mr. H. Mark Grove, Assistant Deputy Under Secretary of Defense for Research and Advanced Technology before the Defense Subcommittee of the Committee on Appropriations of the United States House of Representatives, 97th Congress, second session
[AD-A116788] N82-34339
USAF Summer Faculty Research Program. Volume 1: 1981 research reports
[AD-A113708] N82-34340
USAF Summer Faculty Research Program. Volume 2: 1981 research reports
[AD-A113709] N82-34341
RESIDENTIAL ENERGY
Stand-alone ignition devices
[PB82-180662] N82-33488
Residential heating and cooling loads and costs for the South
[DE82-009504] N82-33853
Home retrofitting for energy conservation and solar considerations
[DE82-013420] N82-33860
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory
[DE82-010867] N82-33866
Data report for the Northwest Residential Experiment Station, December 1981
[DE82-016027] N82-33868
Energy-conserving passive solar multi-family retrofit projects. Cycle 5, category 1: HUD Solar Heating and Cooling Demonstration Program
[PB82-180944] N82-33880
Residential solar data center: Data resources and reports
[PB82-180845] N82-33883
RESIDUAL STRESS
Longitudinal shrinkage of eccentric single-pass welds
[PB82-174731] N82-33720
Acoustic strain visualization in structural materials
[AD-A116992] N82-33771
RESIN MATRIX COMPOSITES
Dynamic mechanical analysis and organization/storage of data for polymetric materials
[NASA-CR-166413] N82-33527
Acetylene terminated sulfone resin development
[AD-A117243] N82-33531
RESISTANCE
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994
Cold weather goggles. Part 3: Resistance to fogging
[AD-A115898] N82-34078
RESONANT FREQUENCIES
Finite-amplitude standing waves in a cavity with boundary perturbations
[AD-A115719] N82-34192
RESONATORS
Waveguide Y-circulator
[AD-A112086] N82-33637
RESPIRATION
Respiratory adaptation to acute metabolic acidosis in goats with ablated carotid bodies
[AD-A116657] N82-33984
An apparatus for the measurement of pulmonary function in unanesthetized small animals
[AD-A114938] N82-33985
Ventilatory responses to exercise while eliciting the relaxation response
[AD-A115102] N82-34015
RETORT PROCESSING
Stress distribution and pillar design in oil shale retorts
[PB82-176256] N82-33582
RETROREFLECTORS
Low noise lead screw positioner
[NASA-CASE-NPO-15617-1] N82-33681
REYNOLDS NUMBER
Results of buffet tests in a cryogenic wind tunnel
[NASA-TM-84520] N82-33342
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672
Supersonic jet noise generated by large scale instabilities
[NASA-TP-2072] N82-34189
RHEOLOGY
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542
RIBS (SUPPORTS)
Investigations on the improvement of corrosion resistance and strength of ribbed reinforcing steel bars in concrete, especially when subject to fatigue loading
[PB82-204330] N82-33787
RIGID STRUCTURES
The Catskill-Cairo experimental rigid pavement: A ten-year progress report
[PB82-201229] N82-33589
Semirigid coaxial RF cable bending techniques
[DE82-016029] N82-33785
RING CURRENTS
Formation of relativistic electron beam rings in a conducting cavity
[IPPJ-583] N82-34237
Evolution of ring current formed by relativistic electron beam injection into a charge but not current neutralizing plasma
[IPPJ-576] N82-34247
RINGS (MATHEMATICS)
Finite-element analysis of some full- and partial-ring crack-propagation test specimens
[AD-A117674] N82-33783
RISK
Automotive Stirling Engine Mod 1 Design Review, volume 1
[NASA-CR-167935] N82-34311

RIVERS
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
ROADS
Pavement thickness, surface evenness and construction practice
[PB82-202599] N82-33586
ROBOTS
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 1: Executive summary
[NASA-CR-162079] N82-34127
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 3: ARAMIS overview
[NASA-CR-162081] N82-34128
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 1: Study results
[NASA-CR-165975] N82-34129
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation, volume 2, part 1. Appendix A: Software documentation
[NASA-CR-165976] N82-34130
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 2, Part 2: Appendixes B, C, D and E
[NASA-CR-165977] N82-34131
ROBUSTNESS (MATHEMATICS)
Robust regression procedures for predictor variable outliers
[AD-A117022] N82-34167
ROCK MECHANICS
Field and in-situ rock-mechanics testing manual
[DE82-015762] N82-33940
ROCKET ENGINES
Study of laser heated propulsion devices. Part 2: Assessment of laser propulsion modeling and simulation requirements
[NASA-CR-170626] N82-33697
Diffuser/ejector system for a very high vacuum environment
[NASA-CASE-MFS-15791-1] N82-33712
ROCKET EXHAUST
Predictive model for jet engine test cell opacity
[AD-A117585] N82-33397
ROCKET LAUNCHING
Aeronautical knowledge (selected articles)
[AD-A115649] N82-33335
ROCKS
Active microwave remote sensing research program plan. Recommendations of the Earth Resources Synthetic Aperture Radar Task Force --- application areas: vegetation canopies, surface water, surface morphology, rocks and soils, and man-made structures
[NASA-CR-167726] N82-33596
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium
[DE82-009289] N82-33673
Applications of texture analysis for rock types discrimination
[AD-A117076] N82-33798
Hot-dry-rock geothermal resource 1980
[DE82-015082] N82-33863
Geotechnical issues and guidelines for storage of compressed air in excavated hard rock caverns
[DE82-015027] N82-33872
Natural processes influencing terrain attributes. Report 1: Prediction of residual soil texture in humid temperature climates of the Federal Republic of Germany and selected analogous portions of the United States, pilot study
[AD-A116939] N82-33926
New pressure test for determining coefficient of permeability of rock masses
[AD-A116982] N82-33927
ROLL
Visual/motion cue mismatch during a coordinated roll maneuver N82-34055
ROLLING CONTACT LOADS
Mechanics of surface damage in elastohydrodynamic contacts
[AD-A117458] N82-33537
On the road performance tests of electric test vehicle for correlation with road load simulator
[NASA-TM-82900] N82-33829
ROLLING MOMENTS
Rolling flow wind tunnel tests of F-18 aircraft
[NASA-CR-169344] N82-33338
ROOM TEMPERATURE
Method of evaluating the thermal stability of the pyroelectric properties of polyvinylidene fluoride effects of poling temperature and field
[AD-A117388] N82-33536
ROOMS
Indoor pollutants
[PB82-180563] N82-33904
ROOTS OF EQUATIONS
Newton's method
[DE82-013692] N82-34134
ROTARY STABILITY
Family of airfoil shapes for rotating blades --- for increased power efficiency and blade stability
[NASA-CASE-LAR-12843-1] N82-33372
ROTARY WINGS
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357
Family of airfoil shapes for rotating blades --- for increased power efficiency and blade stability
[NASA-CASE-LAR-12843-1] N82-33372
Rotorcraft blade mode damping identification from random responses using a recursive maximum likelihood algorithm
[NASA-CR-3600] N82-33373
Voice Interactive Systems Technology Avionics (VISTA) Program
[AD-A117288] N82-33383
ROTATING CYLINDERS
Incompressible flow in a rapidly rotating cylinder with a source/sink distribution in the lateral wall and a free inner boundary
[DE82-011031] N82-33674
Optical rotary joint
[AD-A117025] N82-34226
ROTATING PLASMAS
Structure of field rotating disturbances in warm plasma
[NASA-CR-169359] N82-34256
ROTOR BLADES
Supersonic cascade flows with subsonic axial Mach number
[CUED/A-TURBO/TR-110] N82-33343
Finite difference modeling of rotor flows including wake effects
[NASA-TM-84280] N82-33345
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-169352] N82-33374
Rotor tip clearance effects on overall and blade-element performance of axial-flow transonic fan stage
[NASA-TP-2049] N82-33389
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-3619] N82-33734
ROTORS
Engine dynamic analysis with general nonlinear finite element codes. Part 2: Bearing element implementation overall numerical characteristics and benchmaking
[NASA-CR-167944] N82-33390
Theoretical and experimental power from large horizontal-axis wind turbines
[NASA-TM-82944] N82-33830
RUBBER
Analyses of beams constructed of nonlinear materials having different behavior in tension and compression
[AD-A117944] N82-33777
Analytical and experimental investigations of bimodular composite beams
[AD-A117945] N82-33778
RUNGE-KUTTA METHOD
Numerical stability analysis of a compressor model
[AD-A116878] N82-33396
RUNWAY CONDITIONS
Testing of tritium-powered runway distance and taxiway markers
[AD-A114558] N82-33408
RUNWAY LIGHTS
Testing of tritium-powered runway distance and taxiway markers
[AD-A114558] N82-33408
RUNWAYS
Testing of tritium-powered runway distance and taxiway markers
[AD-A114558] N82-33408
RURAL AREAS
Design description of the Tangaye Village photovoltaic power system
[NASA-TM-82917] N82-33828

S

S WAVES
Evaluation of techniques for predicting soil liquefaction and verification of field techniques to predict in situ shear wave velocity
[PB82-168444] N82-33581
SABOTAGE
Effectiveness of the Civil Aviation Security program
[AD-A117671] N82-33362
SAFETY
Integrated environmental and safety assessment of selected mechanical energy storage systems
[DE82-902073] N82-33851
SAFETY DEVICES
Extensional collapse modes of structural members N82-33765
SAFETY FACTORS
Automotive Stirling Engine Mod 1 Design Review, volume 1
[NASA-CR-167935] N82-34311
SALT BEDS
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary
[DE82-008345] N82-33877
SAMARIUM COMPOUNDS
Ultimate intrinsic coercivity samarian-cobalt magnet. An Earth based feasibility study for Space Shuttle missions
[NASA-CR-170627] N82-33495
SAMPLING
Adaptive sampling for enhanced performance of an ion detection system for a triple quadupole mass spectrometer
[AD-A117441] N82-33471
Sampling of liquid effluents from refineries
[PB82-174657] N82-33908
Pilot opinions of sampling effects in lateral-directional control N82-34053
Ranking and subset selection procedures for exponential populations with Type-1 and Type-2 censored data
[AD-A115821] N82-34161
SANDS
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
SANDWICH STRUCTURES
Research on dynamics of composite and sandwich plates, 1979 - 1981
[AD-A117946] N82-33441
Analytical and experimental investigations of bimodular composite beams
[AD-A117945] N82-33778
SATELLITE ATTITUDE CONTROL
Feasibility evaluation and study of adapting the attitude reference system to the Orbiter camera payload system's large format camera
[NASA-CR-167629] N82-33420
SATELLITE NETWORKS
Earth station interface for demand assignment applications
[AD-A117721] N82-33627
SATELLITE OBSERVATION
Cartographic mapping study
[NASA-CR-170446] N82-33795
Applications of texture analysis for rock types discrimination
[AD-A117076] N82-33798
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973
SATELLITE ORBITS
Effect of satellite orbit error on computed coordinates of Doppler receivers
[AD-A116894] N82-33416
Use of the Charge/Discharge (C/D) ratio to aument voltage limit (V sub T) charge control in the ERBS spacecraft
[NASA-TM-83991] N82-33824
SATELLITE TRACKING
Effect of satellite orbit error on computed coordinates of Doppler receivers
[AD-A116894] N82-33416
SATELLITE TRANSMISSION
Satellite communications/direct broadcast satellites
[GPO-90-289] N82-33412
International shortwave broadcasting and direct broadcast satellites: Voice of America, Radio Free Europe/Radio Liberty, Radio Marti
[H-REPT-97-398] N82-33595
SATURN (PLANET)
Detection of nonthermal continuum radiation in Saturn's magnetosphere
[NASA-CR-169231] N82-34326

SAWS
The Shock and Vibration Digest, volume 14, no. 2
[AD-A111521] N82-33564
Band saw and circular saw vibration and stability N82-33566
SCALING LAWS
A scaling law of neutron yield for DT discharge in plasma focus
[IPPJ-600] N82-34254
SCATTERING CROSS SECTIONS
Central production and small-angle elastic scattering in the valon model
[DE82-008367] N82-34205
Determination of metastable fraction in an ion beam extracted from ECR plasma
[IPPJ-580] N82-34236
SCHEDULING
An assessment of PERT as a technique for schedule planning and control
[NASA-TM-83265] N82-33981
Nearly on line scheduling of multiprocessor systems with memories
[AD-A116823] N82-34090
Scheduling maintenance operations which cause age-dependant failure rate changes
[AD-A117267] N82-34293
Stochastic availability of a repairable system with an age and maintenance dependent failure rate
[AD-A116932] N82-34294
SCHOOLS
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Beverly High School, Beverly, Mass.
[DE82-008622] N82-33879
SCHOTTKY DIODES
The planar doped barrier: A new class of electronic devices
[AD-A117307] N82-33644
SCHROEDINGER EQUATION
Simple way of solving the hydrogen atom problem
[DE82-700020] N82-34204
Interrelation of alternative sets of Lax-pairs for a generalized nonlinear Schroedinger equation --- in relation to soliton physics
[IPPJ-585] N82-34251
SCIENTIFIC SATELLITES
An atlas of ionospheric F-region structures as determined by the NRL-747/S3-4 ionospheric irregularities satellite investigation
[AD-A117269] N82-33923
SCINTILLATION
Path integral formation of wave propagation in the ionosphere
[AD-A117723] N82-33628
SCREWS
Low noise lead screw positioner
[NASA-CASE-NPO-15617-1] N82-33681
SCRUBBERS
Predictive model for jet engine test cell opacity
[AD-A117585] N82-33397
SEA BREEZE
Objective specification of Atlantic Ocean wind fields from historical data
[AD-A117683] N82-33958
SEA ICE
Part 1: Ancient arctic ice does not contain large excesses of natural lead. Part 2: Chronological variations in lead and barium concentrations and lead isotopic compositions in sediments of four southern California off-shore basins N82-33791
Sea ice rubble formations in the Bering Sea and Norton Sound, Alaska
[AD-A113773] N82-33801
SEA LEVEL
Atlantic coast water-level climate
[AD-A117147] N82-33951
SEA STATES
A theoretical appraisal of the joint effects of turbulence and of Langmuir circulations on the dispersion of oil spilled in the sea
[AD-A117844] N82-33894
Oceanic frontal stability: A numerical model
[AD-A115519] N82-33976
SEA WATER
The interaction of manganese(II) with the surface of calcite in dilute solutions and seawater
[DE82-011104] N82-33475
Durability of reinforced concrete beams exposed to marine environment
[AD-A117284] N82-33768
SEALERS
High performance channel injection sealant invention abstract
[NASA-CASE-ARC-14408-1] N82-33523
SEALING
Arc-sprayed metals for structural electromagnetic shielding
[AD-A117673] N82-33629
SEAMOUNTS
Aeromagnetic detection and definition of seamounts
[AD-A117153] N82-33971
SEARCHING
A pilot study of human factors in SAR
[AD-A117917] N82-34087
Category and word search: Generalizing search principles to complex processing
[AD-A115130] N82-34301
SEASAT SATELLITES
SEASAT satellite radar altimetry data processing system
[AD-A115972] N82-33797
SEATS
Results from tests of three prototype general aviation seats
[NASA-TM-84533] N82-33733
SEAWEEDS
Biomass production, anaerobic digestion, and nutrient recycling of small benthic or floating seaweeds
[DE82-009172] N82-33843
SECURITY
Effectiveness of the Civil Aviation Security program
[AD-A117671] N82-33362
SEDIMENTARY ROCKS
The comparative sedimentology of the Bahama type shelf carbonates of the middle Ordovician St. Paul group of the central Appalachians N82-33915
SEDIMENTS
Hydrocarbon fuel chemistry: Sediment water interaction
[AD-A117928] N82-33552
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
Magnetostratigraphy and magnetic properties of the Pliocene Glenns Ferry formation of southwest Idaho N82-33913
On the current status of theoretical modeling of acoustic waves in saturated sediments
[AD-A117847] N82-34194
SEISMIC WAVES
Seismic waves N82-33563
Evaluation of techniques for predicting soil liquefaction and verification of field techniques to predict in situ shear wave velocity
[PB82-168444] N82-33581
Estimates of crustal transmission losses using MLM array processing
[AD-A117278] N82-33929
Three-dimensional velocity structure of the crust and upper mantle beneath the Nevada test site
[AD-A114241] N82-33932
SEISMOLOGY
Seafloor earthquake measurement system. Volume 2: Electronic hardware description
[DE82-009319] N82-33942
SELECTION
Ranking and subset selection procedures for exponential populations with Type-1 and Type-2 censored data
[AD-A115821] N82-34161
NOMBAS: A Bayesian procedure for selecting the greatest mean
[AD-A117611] N82-34178
SEMANTICS
A summary discussion of CONLAN
[AD-A117461] N82-34113
SEMICONDUCTOR DEVICES
Equilibrium noise in ion selective field effect transistors
[AD-A117525] N82-33652
Utilization of quantum distribution functions for ultra submicron device transport
[AD-A117433] N82-34280
Growth and Characterization of In(1-x)Ga(x) As(y)P(1-y) and GaAs using molecular beam epitaxy
[AD-A117507] N82-34282
SEMICONDUCTORS (MATERIALS)
Three-dimensional numerical studies of the physics of semiconductor crystal growth
[AD-A116861] N82-34277
Characterization of infrared optical properties of layered semiconductors
[AD-A117729] N82-34285
SENSORS
Evaluation of SMART sensor displays for multidimensional precision control of Space Shuttle remote manipulator N82-34074
SEPARATED FLOW
User's manual for interfacing a leading edge, vortex rollup program with two linear panel methods
[NASA-TM-78584] N82-33340
Euler solutions of supersonic wing-body interference at high incidence including vortex effects
[NEAR-TR-263] N82-33341
Interaction of oscillations of channel flow and flow separation at duct discontinuities
[AD-A116801] N82-33666
Separated diffuser flow analysis, volume 1
[AD-A117668] N82-33669
SEQUENCING
Method for sequentially processing a multi-level interconnect circuit in a vacuum chamber
[NASA-CASE-MFS-15670-1] N82-33634
SEQUENTIAL ANALYSIS
NOMBAS: A Bayesian procedure for selecting the greatest mean
[AD-A117611] N82-34178
SERIES (MATHEMATICS)
Solution of Von Karman's plate equation with perturbation and series summation N82-33761
SERVICE LIFE
Surveillance report. Stage 1: Dissected motors. Phase 13: Propellant and component testing
[AD-A117604] N82-33426
SERVOCONTROL
Servo systems of combined control
[AD-A115994] N82-33639
SERVOMECHANISMS
Integrated systems of automatic radio equipment
[AD-A115670] N82-33602
Servo systems of combined control
[AD-A115994] N82-33639
SHALE OIL
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil, part 5
[AD-A117438] N82-33551
Stress distribution and pillar design in oil shale retorts
[PB82-176256] N82-33582
SHALLOW WATER
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
SHAPE MEMORY ALLOYS
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501
SHAPES
Navier-Stokes computations for conventional and hollow projectile shapes at transonic velocities
[AD-A116866] N82-33355
SHEAR FLOW
Instability in simple shear deformation of stress-softening materials
[DE82-013525] N82-33786
SHEAR LAYERS
Supersonic jet noise generated by large scale instabilities
[NASA-TP-2072] N82-34189
SHEAR PROPERTIES
Instability in simple shear deformation of stress-softening materials
[DE82-013525] N82-33786
An experimental study of bolted shear connections
[PB82-201518] N82-33788
Statistical analysis of upper ocean time series of vertical shear
[AD-A117286] N82-33969
Effect of magnetic shear on the electrostatic ion cyclotron waves in magnetospheric plasmas
[NASA-CR-169229] N82-34183
SHEAR STRENGTH
Characterization of adhesively bonded aluminum armor through qualitative analytical techniques
[AD-A117710] N82-33784
SHEARING
Instability in simple shear deformation of stress-softening materials
[DE82-013525] N82-33786
SHEATHS
Flow phenomena in compressor casing treatment
[CUED/A-TURBO/TR-112] N82-33661
SHELL STABILITY
Further initial imperfection measurements of integrally Stringer stiffened cylindrical shell, series 2
[TAE-404] N82-33731
A mixed formulation finite element for linear thin shell analysis N82-33753
SHELLS (STRUCTURAL FORMS)
Recent progress in the dynamic plastic behavior of structures, part 3 N82-33729

A finite element approach for shells of revolution with a local deviation N82-33756
Three-dimensional finite-element analysis of layered composite structures [AD-A117492] N82-33780

SHIPS
Does man always close the loop in trying to pilot a large ship? N82-34068

SHOCK RESISTANCE
The Shock and Vibration Digest, volume 14, no. 1 [AD-A111336] N82-33561

SHOCK TESTS
The literature of vibration engineering N82-33562

SHOCK WAVE ATTENUATION
A summary of the results of a study of acoustic bottom interaction in a range dependent environment [AD-A116891] N82-33970

SHOCK WAVES
Wind-tunnel drag measurements of a ball-obturated tubular projectile [AD-A117268] N82-33551
The shock front rise time in water [AD-A117426] N82-34228

SHORT CIRCUITS
Short-circuit formation during NiCd cell reversal [AD-A117912] N82-33836

SHORT TAKEOFF AIRCRAFT
Analysis of several glidepath and speed control autopilot concepts for a powered lift STOL aircraft [NASA-TM-84282] N82-33400

SHORT WAVE RADIO TRANSMISSION
International shortwave broadcasting and direct broadcast satellites: Voice of America, Radio Free Europe/Radio Liberty, Radio Marti [H-REPT-97-398] N82-33595

SHRINKAGE
Longitudinal shrinkage of eccentric single-pass welds [PB82-174731] N82-33720

SIERRA NEVADA MOUNTAINS (CA)
Turbulent diffusion studies of winter storms over the Sierra Nevada Mountains [PB82-178898] N82-33965
Cloud physics studies in SCPP(Sierra Cooperative Pilot Project) during 1980-1981 [PB82-174210] N82-33967

SIGNAL DISTORTION
The mean and variance of skywave radar sea-echo power spectra for discrete ionospheric multipath [PB82-174236] N82-33631

SIGNAL ENCODING
Properties of even length Barker codes and specific polyphase codes with Barker type autocorrelation functions [AD-A117415] N82-33622

SIGNAL PROCESSING
Methods for 2-beam array processing [AD-A116880] N82-33605
Measured performance of a delay lock tracking loop when noise power exceeds signal power [AD-A116797] N82-33606
Responses of FM/CW systems having filters [AD-A117371] N82-33617
Properties of even length Barker codes and specific polyphase codes with Barker type autocorrelation functions [AD-A117415] N82-33622
Earth station interface for demand assignment applications [AD-A117721] N82-33627
Timing subsystem development [AD-A117609] N82-33647
Estimates of crustal transmission losses using MLM array processing [AD-A117278] N82-33929
Advanced on-board signal processor gallium arsenide memory [AD-A117151] N82-34091
A functional model for the closely spaced object resolution process [AD-A116890] N82-34150
A communications optical processing technique [AD-A116047] N82-34219

SIGNAL TO NOISE RATIOS
Ultrasonic measurement of case depth in case hardened steels. Evaluation of feasibility for the ultrasonic measurement of case depth in case hardened steels [AD-A117901] N82-33505
Measured performance of a delay lock tracking loop when noise power exceeds signal power [AD-A116797] N82-33606
Development of a minicomputer atmospheric noise model [AD-A117851] N82-33936

SIGNATURE ANALYSIS
Interferometric observations of solar flare precursors at 10.6 GHz [AD-A115870] N82-34329

SILICA GLASS
Effects of ionization on silicate glasses [DE82-012595] N82-33544

SILICATES
Effects of ionization on silicate glasses [DE82-012595] N82-33544

SILICON
High-aspect-ratio silicon-cell metallization [DE82-011687] N82-33861
Radiation damage and annealing effects studies of silicon-implanted gallium arsenide [AD-A117884] N82-34284

SILICON ALLOYS
Fundamental research directed to advanced high temperature coating systems beyond the current state-of-the-art systems [AD-A117845] N82-33504

SILICON COMPOUNDS
Toxicity of silicon compounds [DE82-014245] N82-34022

SILOXANES
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium [AD-A117814] N82-33541

SIMULATION
A simulation language approach to structural interaction problems N82-33758

SINE WAVES
An experimental study of human pilot's scanning behavior N82-34044

SINGLE CRYSTALS
Studies of metal: Semiconductor interfaces in catalysis and energy conversion [DE82-011863] N82-33509
Resolution of factors responsible for difficulty in growing single crystals of YAG [AD-A117401] N82-34279
A program of research on microfabrication techniques for VLSI magnetic devices [AD-A117922] N82-34281

SITE SELECTION
Guidelines for siting WECS relative to small-scale terrain features [DE82-009124] N82-33847
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary [DE82-008345] N82-33877
Wind energy feasibility assessment for the US Virgin Islands, siting assessment, economic study and project plan [DE82-009476] N82-33961

SIZE (DIMENSIONS)
Effect of specimen size on the fracture toughness of Type 304 stainless steel [DE82-012517] N82-33517

SLIDING
An experimental study of bolted shear connections [PB82-201518] N82-33788

SLIDING FRICTION
The effect of carbon and boron on the friction behavior of Ti-implanted 52100 bearing steel at low sliding speeds [AD-A117742] N82-33500
Thermal effects in rolling/sliding contact [AD-A117702] N82-33719
The development of a thermal distortion code using the finite element method [AD-A116868] N82-33766

SLOPES
TRACALS evaluation report. Special report: A procedure for RTT position improvement using linear regression analysis of glide slope structure [AD-A115926] N82-33365
Family of airfoil shapes for rotating blades --- for increased power efficiency and blade stability [NASA-CASE-LAR-12843-1] N82-33372
Irregular wave runup on smooth slopes [AD-A113648] N82-33975

SLOTS
Flow phenomena in compressor casing treatment [CUED/A-TURBO/TR-112] N82-33661

SLURRIES
Atomization characteristics of coal-water mixtures [DE82-009093] N82-33477
Apparatus development for measuring heat flux in a direct coal-liquefaction preheater [DE82-012013] N82-33692

SMOKE
Flight instabilities of spinning projectiles having non-rigid payloads [AD-A117311] N82-33354
Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary [AD-A116794] N82-33925

SNOW
An empirical model for near millimeter wave snow extinction and backscatter [AD-A117350] N82-33610
Forecasting heavy snow at Wenatchee, Washington [PB82-177783] N82-33960
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981 [PB82-176967] N82-33966

SNOW COVER
Snowpack profile analysis using extracted thin sections [AD-A117639] N82-33957

SOCIAL FACTORS
Integrated environmental and safety assessment of selected mechanical energy storage systems [DE82-902073] N82-33851

SODIUM FLUORIDES
Micom program in light control by light [AD-A117159] N82-33706

SOFTWARE TOOLS
Description/demonstration of BIODYN-80. A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limbs, head and eyes N82-34057

SOIL EROSION
Natural processes influencing terrain attributes. Report 1: Prediction of residual soil texture in humid temperature climates of the Federal Republic of Germany and selected analogous portions of the United States, pilot study [AD-A116939] N82-33926

SOIL MECHANICS
Evaluation of techniques for predicting soil liquefaction and verification of field techniques to predict in situ shear wave velocity [PB82-168444] N82-33581

SOILS
Active microwave remote sensing research program plan. Recommendations of the Earth Resources Synthetic Aperture Radar Task Force --- application areas: vegetation canopies, surface water, surface morphology, rocks and soils, and man-made structures [NASA-CR-167726] N82-33596
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes [DE82-903730] N82-33898
Natural processes influencing terrain attributes. Report 1: Prediction of residual soil texture in humid temperature climates of the Federal Republic of Germany and selected analogous portions of the United States, pilot study [AD-A116939] N82-33926

SOLAR ARRAYS
Data report for the Northwest Residential Experiment Station, December 1981 [DE82-016027] N82-33868
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Beverly High School, Beverly, Mass. [DE82-008622] N82-33879

SOLAR CELLS
Development of copper sulfide/cadmium sulfide thin-film solar cells [DE82-009398] N82-33842
Intermediate photovoltaic system application experiment operational performance. Volume 6: Newman Power Station, El Paso, Texas [DE82-008483] N82-33845
High-aspect-ratio silicon-cell metallization [DE82-011687] N82-33861
Preparation and characterization of amorphous ZnAs for use in solar cells [DE82-014516] N82-33867
Competition in the photovoltaics industry: A question of balance [PB82-171570] N82-33886

SOLAR COLLECTORS
Development of a direct-absorption high-temperature gas receiver [DE82-010168] N82-33838
Solar-heated municipal swimming pools, a case study: Dade County, Florida [DE82-009475] N82-33844
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings [DE82-015158] N82-33865
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory [DE82-010867] N82-33866
Assessment of the field status of active solar systems. Volume 2: Appendices [DE82-016032] N82-33878

SOLAR CONSTANT
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899
SOLAR COOLING
Energy storage using phase-change materials for active solar heating and cooling: An evaluation of future research and development direction
[DE82-014656] N82-33857
Solar-heating and -cooling research projects: A summary
[DE82-903152] N82-33864
Residential solar data center: Data resources and reports
[PB82-180845] N82-33883
SOLAR CORONA
The white light solar corona: An atlas of K-coronameter synoptic charts, August 1980 - September 1981
[PB82-179706] N82-34334
SOLAR ELECTRONS
The impulsive phase of solar flares. 2: Characteristics of the hard X-rays
[NASA-CR-169379] N82-34328
SOLAR ENERGY
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859
Home retrofitting for energy conservation and solar considerations
[DE82-013420] N82-33860
Solar- and wind-powered irrigation systems
[PB82-177486] N82-33887
SOLAR ENERGY CONVERSION
Design description of the Tangaye Village photovoltaic power system
[NASA-TM-82917] N82-33828
Solar-heated municipal swimming pools, a case study: Dade County, Florida
[DE82-009475] N82-33844
An assessment of the field status of active solar systems
[DE82-011939] N82-33845
Technology assessment of solar-energy systems. Part 1: An analysis of life-cycle costs of solar facilities. Part 2: Minerals critical to the development of future energy technologies in high and low solar scenarios
[DE82-012339] N82-33852
Energy-conserving passive solar multi-family retrofit projects. Cycle 5, category 1: HUD Solar Heating and Cooling Demonstration Program
[PB82-180944] N82-33880
SOLAR FLARES
The impulsive phase of solar flares. 2: Characteristics of the hard X-rays
[NASA-CR-169379] N82-34328
Interferometric observations of solar flare precursors at 10.6 GHz
[AD-A115870] N82-34329
Solar flare studies
[AD-A114269] N82-34330
SOLAR FLUX
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899
Environmental data for sites in the national solar data network
[DE82-008076] N82-33959
SOLAR GENERATORS
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859
SOLAR HEATING
Solar-heated municipal swimming pools, a case study: Dade County, Florida
[DE82-009475] N82-33844
An assessment of the field status of active solar systems
[DE82-011939] N82-33845
Energy storage using phase-change materials for active solar heating and cooling: An evaluation of future research and development direction
[DE82-014656] N82-33857
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859
Solar-heating and -cooling research projects: A summary
[DE32-903152] N82-33864
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865
Assessment of the field status of active solar systems. Volume 2: Appendices
[DE82-016032] N82-33878
Residential solar data center: Data resources and reports
[PB82-180845] N82-33883
SOLAR HOUSES
Energy-conserving passive solar multi-family retrofit projects. Cycle 5, category 1: HUD Solar Heating and Cooling Demonstration Program
[PB82-180944] N82-33880
Residential solar data center: Data resources and reports
[PB82-180845] N82-33883
SOLAR RADIATION
Solar- and wind-powered irrigation systems
[PB82-177486] N82-33887
Environmental data for sites in the national solar data network
[DE82-008076] N82-33959
SOLAR REFLECTORS
Illumination from space with orbiting solar-reflector spacecraft
[NASA-TP-2065] N82-33421
SOLAR SENSORS
Environmental data for sites in the national solar data network
[DE82-008076] N82-33959
SOLAR SPECTRA
Solar flare studies
[AD-A114269] N82-34330
SOLAR SYSTEM
A bibliography of planetary geology principal investigators and their associates, 1981 - 1982
[NASA-CR-3593] N82-34313
SOLAR WIND
On the thermal stability of coronal loop plasma
[NASA-CR-169347] N82-34327
Solar flare studies
[AD-A114269] N82-34330
SOLAR X-RAYS
The impulsive phase of solar flares. 2: Characteristics of the hard X-rays
[NASA-CR-169379] N82-34328
Solar flare studies
[AD-A114269] N82-34330
SOLID PROPELLANT ROCKET ENGINES
Surveillance report. Stage 1: Dissected motors. Phase 13: Propellant and component testing
[AD-A117604] N82-33426
Probabilistic environmental model for solid rocket motor life prediction
[AD-A117651] N82-33427
SOLID ROCKET PROPELLANTS
Surveillance report. Stage 1: Dissected motors. Phase 13: Propellant and component testing
[AD-A117604] N82-33426
Probabilistic environmental model for solid rocket motor life prediction
[AD-A117651] N82-33427
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A117080] N82-33549
SOLID SOLUTIONS
Mullite-titanium dioxide solid solutions
[DE82-009031] N82-34288
SOLID STATE LASERS
Development of host crystals for Ce(+3) blue and blue-green solid-state lasers
[AD-A117899] N82-33710
SOLID SUSPENSIONS
Spherical agglomeration of flocculated precipitate
[NRC/CNR-TT-2024] N82-33462
SOLID WASTES
Development of a waste-to-energy plan: City of Columbia, Missouri
[DE82-009288] N82-33850
SOLIDIFICATION
A primer on sulfur for the planetary geologist
[NASA-CR-3594] N82-33459
Optical Studies of model binary miscibility gap system
[NASA-TM-82494] N82-33683
SOLIDS
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354
SOLITARY WAVES
Interrelation of alternative sets of Lax-pairs for a generalized nonlinear Schroedinger equation — in relation to soliton physics
[IPPJ-585] N82-34251
SOLUBILITY
Optical Studies of model binary miscibility gap system
[NASA-TM-82494] N82-33683
SOLUTIONS
High pressure NMR studies of the dynamic structure of liquids N82-33450
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542
SOLVENT EXTRACTION
Selective metal-ion extraction for multiple-ion liquid-liquid exchange reactions
[DE82-011721] N82-33474
Solvent extraction of nickel and copper from laterite-ammoniacal leach liquors
[PB82-176587] N82-33518
SOLVENT REFINED COAL
Hydroprocessing of solvent-refined coal: Catalyst-screening results
[DE82-008568] N82-33479
Solvent Refined Coal (SRC) Process. Effect of mixing energy on hydrogen reaction rates in SRC-II reactors
[DE82-008447] N82-33481
Status report for the Solvent-Refined-Coal (SRC-2) demonstration project
[DE82-009653] N82-33483
The H-coal and SRC-2 processes
[PB82-173998] N82-33491
SOLVENTS
Selective metal-ion extraction for multiple-ion liquid-liquid exchange reactions
[DE82-011721] N82-33474
SONAR
Engineering geology and geomorphology of streambank erosion. Report 3: The application of waterborne geophysical techniques in fluvial environments
[AD-A115678] N82-33892
SONIC BOOMS
Sonic boom measurement test plan for Space Shuttle STS-2 reentry
[NASA-TM-84858] N82-34186
SOOT
Predictive model for jet engine test cell opacity
[AD-A117585] N82-33397
SOUND INTENSITY
Variations in noise dosimeter readings of fluctuating noise
[AD-A115763] N82-34002
SOUND LOCALIZATION
Study of the source function by the causality methods defined by Ribner and Siddon
[PB82-205170] N82-34196
SOUND PROPAGATION
Broad band sound from wind turbine generators
[NASA-CR-165810] N82-34187
Sound attenuation over ground cover 3 N82-34337
SOUND TRANSMISSION
A summary of the results of a study of acoustic bottom interaction in a range dependent environment
[AD-A116891] N82-33970
IFD: An implicit finite-difference computer model for solving the parabolic equation
[AD-A117701] N82-34156
SOUND WAVES
Studies of the propagation of elastic waves in fluids and solids
[AD-A117370] N82-33616
Finite-amplitude standing waves in a cavity with boundary perturbations
[AD-A115719] N82-34192
The inverse scattering problem for acoustic waves
[AD-A117048] N82-34193
On the current status of theoretical modeling of acoustic waves in saturated sediments
[AD-A117847] N82-34194
SOUNDING ROCKETS
TMA chemical release payloads for stratospheric wind measurements auroral E program and related programs
[AD-A115832] N82-33921
SOUNDS (TOPOGRAPHIC FEATURES)
Sea ice rubble formations in the Bering Sea and Norton Sound, Alaska
[AD-A113773] N82-33801
SPACE COOLING (BUILDINGS)
NECAP 4.1: NASA's Energy Cost Analysis Program engineering manual
[NASA-TM-83240] N82-33825
NECAP 4.1: NASA's Energy Cost Analysis Program engineering flow chart
[NASA-TM-83242] N82-33826
Residential heating and cooling loads and costs for the South
[DE82-009504] N82-33853
Solar-heating and -cooling research projects: A summary
[DE82-903152] N82-33864
SPACE ENVIRONMENT SIMULATION
Diffuser/ejector system for a very high vacuum environment
[NASA-CASE-MFS-15791-1] N82-33712

SPACE HEATING (BUILDINGS)
NECAP 4.1: NASA's Energy Cost Analysis Program engineering manual
[NASA-TM-83240] N82-33825
NECAP 4.1: NASA's Energy Cost Analysis Program engineering flow chart
[NASA-TM-83242] N82-33826
Residential heating and cooling loads and costs for the South
[DE82-009504] N82-33853
Design of the Glenwood Springs downhole heat exchanger
[DE82-013809] N82-33855
Geothermal conversion at Veterans Hospital, Boise, Idaho
[DE82-012198] N82-33856
Solar-heating and -cooling research projects: A summary
[DE82-903152] N82-33864
SPACE MAINTENANCE
Mechanical fastener
[NASA-CASE-LAR-12738-1] N82-33419
SPACE MISSIONS
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 1: Executive summary
[NASA-CR-162079] N82-34127
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 3: ARAMIS overview
[NASA-CR-162081] N82-34128
SPACE PERCEPTION
Optical flow and texture variables useful in simulating self motion
[AD-A117016] N82-34081
SPACE PROCESSING
Containerless processing technology analysis
[NASA-CR-170624] N82-33430
SPACE SHUTTLE ORBITERS
The need for a fifth Space Shuttle orbiter
[GPO-96-894] N82-33418
Shuttle STS-2 mission communication systems RF coverage and performance predictions. Volume 1: Ascent
[NASA-TM-84853] N82-33594
Sonic boom measurement test plan for Space Shuttle STS-2 reentry
[NASA-TM-84858] N82-34186
SPACE SHUTTLE PAYLOADS
Feasibility evaluation and study of adapting the attitude reference system to the Orbiter camera payload system's large format camera
[NASA-CR-167629] N82-33420
Shuttle VLBI experiment. Technical working group summary report
[NASA-TM-82491] N82-34315
SPACE SHUTTLES
Atmospheric constraint statistics for the Space Shuttle mission planning
[NASA-TP-2063] N82-33417
Evaluation of SMART sensor displays for multidimensional precision control of Space Shuttle remote manipulator N82-34074
SPACE STATIONS
Private financing and operation of a space station: Investment requirements, risk, government support and other primary business management considerations
[NASA-CR-169357] N82-34291
SPACE TRANSPORTATION SYSTEM 2 FLIGHT
Shuttle STS-2 mission communication systems RF coverage and performance predictions. Volume 1: Ascent
[NASA-TM-84853] N82-33594
Sonic boom measurement test plan for Space Shuttle STS-2 reentry
[NASA-TM-84858] N82-34186
SPACE TRANSPORTATION SYSTEM 4 FLIGHT
Mission operation report. Space Shuttle program: STS-4 postflight medical operations report
[NASA-TM-84854] N82-34001
SPACEBORNE ASTRONOMY
Shuttle VLBI experiment. Technical working group summary report
[NASA-TM-82491] N82-34315
SPACEBORNE EXPERIMENTS
Spacelab mission 2: Experimental descriptions
[NASA-TM-82477] N82-33411
SPACECRAFT COMMUNICATION
Shuttle STS-2 mission communication systems RF coverage and performance predictions. Volume 1: Ascent
[NASA-TM-84853] N82-33594
SPACECRAFT CONTROL
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-169419] N82-33422
The dynamics and control of large flexible space structures-V
[NASA-CR-169360] N82-33423
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 1: Executive summary
[NASA-CR-162079] N82-34127
SPACECRAFT INSTRUMENTS
Light scattering calculations for the nephelometer experiment on the 1981/1982 Jupiter Orbiter-Probe mission
[NASA-CR-169418] N82-34323
SPACECRAFT ORBITS
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889-VOL-1] N82-33424
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889-VOL-2] N82-33425
SPACECRAFT PROPULSION
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889-VOL-1] N82-33424
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889-VOL-2] N82-33425
Study of laser heated propulsion devices. Part 1: Evaluation of laser devices, fuels and energy coupling mechanisms
[NASA-CR-170625] N82-33696
Study of laser heated propulsion devices. Part 2: Assessment of laser propulsion modeling and simulation requirements
[NASA-CR-170626] N82-33697
SPACECRAFT REENTRY
Sonic boom measurement test plan for Space Shuttle STS-2 reentry
[NASA-TM-84858] N82-34186
SPACECREWS
Mission operation report. Space Shuttle program: STS-4 postflight medical operations report
[NASA-TM-84854] N82-34001
SPACELAB PAYLOADS
Spacelab mission 2: Experimental descriptions
[NASA-TM-82477] N82-33411
SPACING
Optimal grouping, spacing, stratification and piecewise constant approximation
[AD-A117023] N82-34166
A quantile domain perspective on the relationships between optimal grouping, spacing and stratification problems
[AD-A116944] N82-34172
SPAIN
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973
SPARE PARTS
Palm's theorem for nonstationary processes
[AD-A117089] N82-34135
SPATIAL DISTRIBUTION
Ultrasonic measurement of case depth in case hardened steels. Evaluation of feasibility for the ultrasonic measurement of case depth in case hardened steels
[AD-A117901] N82-33505
Spatial distributions of phytoplankton: Limitations of power spectrum techniques N82-33968
SPATIAL RESOLUTION
Tracking closely spaced multiple sources via spectral-estimation techniques
[AD-A116967] N82-33607
A functional model for the closely spaced object resolution process
[AD-A116890] N82-34150
SPECIFIC IMPULSE
BLEST impulse time-of-flight sphere
[AD-A116940] N82-33686
SPECIFICATIONS
An approach to describing the functional requirements of an embedded communication system
[AD-A115738] N82-33598
SPECTRAL RECONNAISSANCE
Applications of texture analysis for rock types discrimination
[AD-A117076] N82-33798
SPECTRUM ANALYSIS
Positron annihilation spectroscopy with magnetically analyzed beams
[NASA-TM-84535] N82-33435
A spectrum analyser for acoustic emission
[AD-A117720] N82-33690
The G-spectral estimator
[AD-A116942] N82-34144
Time series model identification, spectral estimation and functional inference
[AD-A117073] N82-34146
Autoregressive spectral estimation and functional inference
[AD-A117113] N82-34173
Autoregressive spectral estimation
[AD-A117266] N82-34174
Maximum entropy interpretation of autoregressive spectral densities
[AD-A117263] N82-34175
Simultaneous confidence bands for autoregressive spectra
[AD-A117072] N82-34176
Spectral equivalence of deterministic and stochastic models for time series with a periodic component
[AD-A117718] N82-34179
The aerospace long-path multiple reflection cell facility
[SD-TR-82-60] N82-34218
SPEECH RECOGNITION
Investigation into Air Launch Cruise Missile (ALCM) flight information loading and display techniques during flex targeting procedure
[AD-A115744] N82-33376
Applications of artificial intelligence in voice recognition systems in micro-computers
[AD-A115735] N82-34132
SPEED CONTROL
Analysis of several glidepath and speed control autopilot concepts for a powered lift STOL aircraft
[NASA-TM-84282] N82-33400
Effects of motivation on car-following N82-34070
SPEED INDICATORS
Analysis of a kite anemometer
[DE82-009058] N82-33691
SPEED REGULATORS
James Clerk Maxwell's Cambridge manuscripts: Extracts relating to control and stability, part 1
[PB82-180571] N82-34160
SPENT FUELS
Spent fuel dry storage technology development: Electrically heated drywell storage test (3kW operation)
[DE82-012567] N82-34216
SPHERES
Feasibility study: Hollow plastic spheres to increase hydraulic fluid compressibility
[NASA-CR-169374] N82-33539
Sphere forming method and apparatus
[NASA-CASE-NPO-15070-1] N82-33567
SPHERICAL HARMONICS
Interpretation of the Earth's gravity field N82-33911
SPHERICAL SHELLS
BLEST impulse time-of-flight sphere
[AD-A116940] N82-33686
SPHEROMAKS
Formation of relativistic electron beam rings in a conducting cavity
[IPPJ-583] N82-34237
SPIN
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354
SPIN STABILIZATION
Device for the control of free-spinning models in a wind tunnel
[AD-A115993] N82-33406
SPINE
A dynamic model of the cervical spine and head
[AD-A114887] N82-34008
SPRAYING
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813
SPRINGS (ELASTIC)
A new analysis of the unwinding ribbon as a delayed arming device
[AD-A117352] N82-33571
SPUTTERING
Mercury cadmium telluride sputtered target research
[AD-A117456] N82-33572
STABILITY
Geotechnical issues and guidelines for storage of compressed air in excavated hard rock caverns
[DE82-015027] N82-33872
STABILIZERS (AGENTS)
Technique for the aerobic cultivation of microorganisms in water-in-oil emulsions
[NRC/CNR-TT-2031] N82-33980
STAINLESS STEELS
Microstructural analysis of austenitic stainless steel welds and their modification during laser welding
[DE82-016036] N82-33515
Effect of specimen size on the fracture toughness of Type 304 stainless steel
[DE82-012517] N82-33517
STANDARDS
Development of avionics installation interface standards
[AD-A116853] N82-33384

United Computing Systems, Inc. CYBER 730, CDC COBOL 5.3 Level 528
[PB82-169509] N82-34100
STANDING WAVES
Circumferentially segmented duct lines optimized for axisymmetric and standing wave sources --- reducing noise from turbofan engines galerkin method acoustic attenuation
[NASA-TP-2075] N82-34190
STATIC PRESSURE
Aerodynamic loads on a ball-obturated tubular projectile
[AD-A115756] N82-33349
STATIC STABILITY
Development of methods for assessment of gliding parachute applications
[AD-A117103] N82-33356
A semi-implicit dynamic relaxation algorithm for static nonlinear structural analysis N82-33740
A three-dimensional stability analysis/design program (3DSAD). Report 3. General Analysis Module (CGAM)
[AD-A117387] N82-33772
Instability in simple shear deformation of stress-softening materials
[DE82-013525] N82-33786
STATISTICAL ANALYSIS
Statistical analysis of upper ocean time series of vertical shear
[AD-A117286] N82-33969
Supervision of dynamic systems: Monitoring, decision-making and control N82-34069
A functional model for the closely spaced object resolution process
[AD-A116890] N82-34150
Edgeworth expansions in statistics: A brief review
[AD-A117061] N82-34165
STATISTICAL CORRELATION
Related correlation coefficients
[AD-A117231] N82-34169
STATISTICAL DISTRIBUTIONS
Inequalities on distributions: Bivariate and multivariate
[AD-A116814] N82-34163
Problems in multivariate analysis and nonparametric statistics: Applications of the theory of combining tests
[AD-A117092] N82-34166
STATISTICAL TESTS
Problems in multivariate analysis and nonparametric statistics: Applications of the theory of combining tests
[AD-A117092] N82-34166
Related correlation coefficients
[AD-A117231] N82-34169
STATOR BLADES
Engine dynamic analysis with general nonlinear finite element codes. Part 2: Bearing element implementation overall numerical characteristics and benchmaking
[NASA-CR-167944] N82-33390
STEADY STATE
The analysis for regulation performance of a variable thrust rocket engine control system
[AD-A117495] N82-33429
STEAM
The potential for industrial cogeneration development by 1990
[RA-81-1455] N82-33822
STEAM FLOW
The fluid mechanics of non-nucleating wet steam flows
[CUED/A-TURBO/TR-111] N82-33662
STEEL STRUCTURES
Program package for nonlinear analysis of reinforced concrete structures
[PB82-204744] N82-33585
Acoustic strain visualization in structural materials
[AD-A116992] N82-33771
Investigations on the improvement of corrosion resistance and strength of ribbed reinforcing steel bars in concrete, especially when subject to fatigue loading
[PB82-204330] N82-33787
STEELS
Ultrasonic measurement of case depth in case hardened steels. Evaluation of feasibility for the ultrasonic measurement of case depth in case hardened steels
[AD-A117901] N82-33505
Effect of simulated medium-Btu coal-gasifier atmospheres on the biaxial stress-rupture behavior of four candidate coal-gasifier alloys
[DE82-010614] N82-33507
Stress corrosion characterization of turbine rotor materials, phase 1
[DE82-902070] N82-33508
Practical applications of hot-isostatic pressing diagrams: Four case studies
[PB82-182336] N82-33574
Arc-sprayed metals for structural electromagnetic shielding
[AD-A117673] N82-33629
The fatigue notch factor revisited
[TAE-446] N82-33732
Reinforced concrete modeling
[AD-A117925] N82-33775
Instability in simple shear deformation of stress-softening materials
[DE82-013525] N82-33786
STEERING
Levels of steering control: Reproduction of steering-wheel movements N82-34071
Analysis of driver performance under reduced visibility N82-34075
STELLAR ATMOSPHERES
The structure, energy balance, and winds of cool stars
[NASA-CR-169356] N82-34318
STELLAR RADIATION
Identification of the emission features near 3.5 microns in the pre main sequence star HD 97048
[NASA-CR-169379] N82-34320
Observations of the reflection nebula NGC 7023 at 2.2 microns N82-34321
STELLAR SPECTRA
Ultraviolet and X-ray detection of the 56 Peg system (KO 2p + WD)
[NASA-CR-169351] N82-34317
Identification of the emission features near 3.5 microns in the pre main sequence star HD 97048
[NASA-CR-169379] N82-34320
STELLAR WINDS
The structure, energy balance, and winds of cool stars
[NASA-CR-169356] N82-34318
STELLARATORS
Helical magnetic configurations produced with the help of ferromagnetic materials. 2: The Helimag
[IPPJ-591] N82-34243
STEREOPHOTOGRAPHY
An analysis of the max-min texture measure
[AD-A116768] N82-33799
STIFFNESS
Vibrations of axially loaded stiffened cylindrical panels with elastic restraints
[TAE-439] N82-33730
Integration of multidimensional regions with applications to finite element analysis N82-33750
STIFFNESS MATRIX
A computer package for the design and eigenproblem solution of damped linear multidegree of freedom systems N82-33764
STIMULANTS
Stimulation of body weight increase and epiphyseal cartilage growth by insulin like growth factor
[NASA-TM-84285] N82-33983
STIMULI
Responses to harmonic acceleration with varying head positions
[AD-A114736] N82-34010
STIRLING CYCLE
Stirling engine with one adiabatic cylinder
[DE82-009606] N82-33849
Automotive Stirling Engine Mod 1 Design Review, volume 1
[NASA-CR-167935] N82-34311
Automotive Stirling Engine Mod 1 Design Review, volume 3 --- engineering drawings
[NASA-CR-167397] N82-34312
STOCHASTIC PROCESSES
Age dependent minimal repair
[AD-A116846] N82-33336
Palm's theorem for nonstationary processes
[AD-A117089] N82-34135
A concept of negative dependence using stochastic ordering
[AD-A116888] N82-34164
Stochastic games. 1: Foundations
[AD-A117085] N82-34177
Stochastic and adaptive systems
[AD-A117029] N82-34182
An analysis of current drive by travelling wave based on theory of intrinsic stochasticity
[IPPJ-575] N82-34235
Stochastic availability of a repairable system with an age and maintenance dependent failure rate
[AD-A116932] N82-34294
STORAGE BATTERIES
Compatibility of polyacetylene with lithium battery materials
[AD-A117684] N82-33837
STORAGE TANKS
Vapor condensation control of JP-4 emissions from underground storage tanks at March Air Force Base, California
[AD-A117875] N82-33554
STORMS
Turbulent diffusion studies of winter storms over the Sierra Nevada Mountains
[PB82-178898] N82-33965
STRAIN RATE
Interaction of heat production, strain rate and stress power in a plastically deforming body under tensile test N82-33746
STRATIFICATION
Optimal grouping, spacing, stratification and piecewise constant approximation
[AD-A117023] N82-34168
A quantile domain perspective on the relationships between optimal grouping, spacing and stratification problems
[AD-A116944] N82-34172
STRATIFIED FLOW
Trailing vortices in stratified fluids
[AD-A117040] N82-33352
STRATIGRAPHY
Magnetostratigraphy and magnetic properties of the Pliocene Glenns Ferry formation of southwest Idaho N82-33913
Geology and evolution of the magmatic rocks of the Vourinos Ophiolite, northern Greece N82-33914
The marine geology of the Bahama Escarpment N82-33916
Calderas and mineralization: Volcanic geology and mineralization in the Chianti caldera complex, Trans-Pecos Texas
[DE82-013263] N82-33941
STRATOSPHERE
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899
STRESS (PHYSIOLOGY)
Stress, anxiety, and cognitive interference: Reactions to tests
[AD-A113564] N82-34031
STRESS ANALYSIS
Synthesis of frameworks under multilevel performance constraints N82-33757
Elastic/plastic finite element analysis of a single edge-cracked beam subjected to mode 1 tensile loading
[AD-A117622] N82-33773
NASTRAN and FEARS analysis of two problems of plane elasticity
[AD-A117713] N82-33782
STRESS CONCENTRATION
Stress distribution and pillar design in oil shale retorts
[PB82-176256] N82-33582
The fatigue notch factor revisited
[TAE-446] N82-33732
A preliminary study of crack initiation and growth at stress concentration sites
[NASA-CR-169358] N82-33738
An exact zooming method for finite element analyses N82-33754
Dynamic response of lined tunnels by boundary elements N82-33755
Synthesis of frameworks under multilevel performance constraints N82-33757
Acoustic strain visualization in structural materials
[AD-A116992] N82-33771
STRESS CORROSION
Fatigue behaviour of advanced structural aluminium alloy 74575-T761 --- for aircraft construction
[TAE-447] N82-33492
Nondestructive method for determining fatigue and stress-corrosion damage
[AD-A117631] N82-33774
Fluoropolymer barriers to stress corrosion in optical fibers
[AD-A117346] N82-34224
STRESS CORROSION CRACKING
Hot tensile tests of Inconel 718
[NASA-CR-162089] N82-33496
Stress corrosion characterization of turbine rotor materials, phase 1
[DE82-902070] N82-33508
STRESS INTENSITY FACTORS
Elastic/plastic finite element analysis of a single edge-cracked beam subjected to mode 1 tensile loading
[AD-A117622] N82-33773
STRESS MEASUREMENT
Acoustic strain visualization in structural materials
[AD-A116992] N82-33771
STRESS RELAXATION
Review of recent irradiation-creep results
[DE82-014570] N82-33512
STRESS-STRAIN DIAGRAMS
Reinforced concrete modeling
[AD-A117925] N82-33775
Finite-element analysis of some full- and partial-ring crack-propagation test specimens
[AD-A117674] N82-33783
STRESS-STRAIN RELATIONSHIPS
Nonlinear constitutive theory for turbine engine structural analysis N82-33744

Interaction of heat production, strain rate and stress power in a plastically deforming body under tensile test N82-33746

STRESSES
The analysis of elastic-plastic deformation and stress at finite strain and their evaluation
[AD-A117505] N82-33779

STRINGERS
Further initial imperfection measurements of integrally Stringer stiffened cylindrical shell, series 2
[TAE-404] N82-33731

STRIP TRANSMISSION LINES
MSTRIP2: Parameters of microstrip transmission lines and of coupled pairs of lines. 1978 version and its application
[AD-A117364] N82-33615

STRUCTURAL ANALYSIS
Program package for nonlinear analysis of reinforced concrete structures
[PB82-204744] N82-33585
Proof testing of a structural plate pipe with varying bedding and backfill parameters. Section 7, volume 1: Finite element analysis program modification and analysis of zone 2
[PB82-201526] N82-33587
An analytical investigation of fin lines with magnetized ferrite substrate
[AD-A117504] N82-33624
Research in structural and solid mechanics, 1982
[NASA-CP-2245] N82-33739
A semi-implicit dynamic relaxation algorithm for static nonlinear structural analysis N82-33740
Minimization versus homotopy algorithms N82-33741
Application of the reduced basis method to nonlinear transient thermal analysis N82-33743
Nonlinear constitutive theory for turbine engine structural analysis N82-33744
Implementation of a C-1 triangular element based on the P-version of the finite element method N82-33749
Integration of multidimensional regions with applications to finite element analysis N82-33750
An emulator for minimizing finite element analysis implementation resources N82-33751
the finite element machine: An experiment in parallel processing N82-33752
An exact zooming method for finite element analyses N82-33754
Advances and trends in plate buckling research N82-33760
The development of a thermal distortion code using the finite element method
[AD-A116868] N82-33766
A three-dimensional stability analysis/design program (3DSAD). Report 3. General Analysis Module (CGAM)
[AD-A117387] N82-33772
Three-dimensional finite-element analysis of layered composite structures
[AD-A117492] N82-33780
A version of the graphics-oriented interactive finite element time-sharing system (GIFTS) for an IBM with CP/CMS
[AD-A116798] N82-34092

STRUCTURAL DESIGN
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-169352] N82-33374
Stress distribution and pillar design in oil shale retorts
[PB82-176256] N82-33582
Proof testing of a structural plate pipe with varying bedding and backfill parameters. Section 7, volume 1: Finite element analysis program modification and analysis of zone 2
[PB82-201526] N82-33587
Design of overlays based on pavement condition, roughness, and deflections
[PB82-201369] N82-33588

STRUCTURAL ENGINEERING
Fusion engineering device. Volume 5: Technology R and D requirements for construction
[DE82-008936] N82-34276

STRUCTURAL FAILURE
Extensional collapse modes of structural members N82-33765

STRUCTURAL MEMBERS
Extensional collapse modes of structural members N82-33765

STRUCTURAL PROPERTIES (GEOLOGY)
Natural processes influencing terrain attributes. Report 1: Prediction of residual soil texture in humid temperature climates of the Federal Republic of Germany and selected analogous portions of the United States, pilot study
[AD-A116939] N82-33926
Platonic plate tectonics: On the regularity of the distribution of triple points on the Earth's surface
[AD-A113777] N82-33931
Field and in-situ rock-mechanics testing manual
[DE82-015762] N82-33940

STRUCTURAL STRAIN
A simulation language approach to structural interaction problems N82-33758
Acoustic strain visualization in structural materials
[AD-A116992] N82-33771

STRUCTURAL VIBRATION
The literature of vibration engineering N82-33562
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-3619] N82-33734
Description/demonstration of BIODYN-80. A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limbs, head and eyes N82-34057

STRUTS
Energy efficient engine: Turbine transition duct model technology report
[NASA-CR-167996] N82-33394

SUBMERGED BODIES
Approximate theory for the transverse motion of a two-layered plate. A theoretical model applicable to acoustic scattering from submerged structures with coating layer(s)
[AD-A117034] N82-33767

SUBMERGING
Influence of the diving response and submersion on the breath-holding time in man N82-33998

SUBMILLIMETER WAVES
Active imaging of range targets at 1.2 millimeters
[AD-A117161] N82-33611

SUBROUTINES
Users guide for SOL/QPSOL: A FORTRAN package for quadratic programming
[AD-A117607] N82-34114

SUBSTRATES
An analytical investigation of fin lines with magnetized ferrite substrate
[AD-A117504] N82-33624
Screening tests of conformally-coated printed wiring boards
[DE82-012873] N82-33656

SUBZERO TEMPERATURE
Low temperature tests of rescue breathing apparatus
[PB82-172727] N82-34086

SUDDEN STORM COMMENCEMENTS
Interferometric observations of solar flare precursors at 10.6 GHz
[AD-A115870] N82-34329

SULFIDES
Measurement of tropospheric carbonyl sulfide by microwave spectrometry
[NASA-CR-169417] N82-33920

SULFITES
Auto-oxidation of sulphites
[NRC/CNR-TT-2023] N82-33465

SULFONES
Acetylene terminated sulfone resin development
[AD-A117243] N82-33531

SULFUR
A primer on sulfur for the planetary geologist
[NASA-CR-3594] N82-33459
Development of a solid absorption process for removal of sulfur from fuel gas
[DE82-012996] N82-33484

SULFUR COMPOUNDS
High energy surfuryl chioride batteries
[AD-A117106] N82-33833

SULFUR FLUORIDES
The examination of electrical-breakdown properties of insulating gases used in electrostatic accelerators
[DE82-009106] N82-33654

SULFUR OXIDES
Preliminary economic analysis of NO sub x flue-gas treatment processes using TVA and EPRI economic premises
[DE82-902223] N82-33895

SULFURIC ACID
Thermochemical water-splitting for hydrogen production
[PB82-208174] N82-33560

SUMS
Solution of Von Karman's plate equation with perturbation and series summation N82-33761

SUN
Solar-geophysical data prompt reports, number 446. Part 1: Data for September 1981, August 1981 and late data. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-171075] N82-34331
Solar-geophysical data prompt reports, number 447. Part 1: Data for October 1981, September 1981 and late date. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-177726] N82-34332
Solar-geophysical data comprehensive reports, number 447. Part 2: Data for May 1981, February 1980 and miscellanea. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-177734] N82-34333
The white light solar corona: An atlas of K-coronameter synoptic charts, August 1980 - September 1981
[PB82-179706] N82-34334

SUPERCONDUCTING MAGNETS
Design concepts and cost studies for magnetic suspension and balance systems --- wind tunnel apparatus
[NASA-CR-165917] N82-33404

SUPERCONDUCTORS
Superconductive niobium oxide tunnel device program
[AD-A117000] N82-33642

SUPERCOOLING
Ice forming experiment
[NASA-CR-170623] N82-33948

SUPERCRITICAL PRESSURES
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893

SUPERCRITICAL WINGS
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[NASA-TM-83276] N82-33736

SUPERGIANT STARS
Evidence for extended chromospheres surrounding red giant stars
[NASA-CR-169349] N82-34316

SUPERSONIC FLIGHT
An inviscid computational method for tactical missile configurations
[AD-A116904] N82-33415

SUPERSONIC FLOW
Euler solutions of supersonic wing-body interference at high incidence including vortex effects
[NEAR-TR-263] N82-33341
Supersonic cascade flows with subsonic axial Mach number
[CUED/A-TURBO/TR-110] N82-33343

SUPERSONIC JET FLOW
Supersonic jet noise generated by large scale instabilities
[NASA-TP-2072] N82-34189

SUPPORTS
Stress distribution and pillar design in oil shale retorts
[PB82-176256] N82-33582

SURFACE DEFECTS
Mechanics of surface damage in elastohydrodynamic contacts
[AD-A117458] N82-33537

SURFACE FINISHING
Surface texturing of fluoropolymers
[NASA-CASE-LEW-13028-1] N82-33521
Placement of an experimental heater-scarified in-place recycled pavement
[PB82-197237] N82-33590

SURFACE LAYERS
Raman spectroscopy for in-situ monitoring of electrode processes
[DE82-014909] N82-33486

SURFACE PROPERTIES
Fifth International Summer Institute in Surface Science, ISISS 1981
[AD-A116933] N82-33469
Resolution of contamination problems affecting laser surface certification inspection
[DE82-008775] N82-33711
Investigation of the Rayleigh critical angle phenomenon for the characterization of surface properties
[AD-A117264] N82-33723
A tutorial solution to scattering of radiation in a thin atmosphere bounded below by a diffusely reflecting, absorbing surface
[NASA-TP-2077] N82-33918
Snowpack profile analysis using extracted thin sections
[AD-A117839] N82-33957

SURFACE REACTIONS
Fifth International Summer Institute in Surface Science, ISISS 1981
[AD-A116933] N82-33469
The interaction of manganese(II) with the surface of calcite in dilute solutions and seawater
[DE82-011104] N82-33475

SURFACE ROUGHNESS
Pavement roughness evaluations using a Mays Ride Meter
[PB82-177841] N82-33580
Pavement thickness, surface evenness and construction practice
[PB82-202599] N82-33586

Placement of an experimental heater-scarified in-place recycled pavement
[PB82-197237] N82-33590
Effect of ground terrain on millimeter wave propagation
[AD-A116837] N82-33614
The roughness lengths associated with regions of heterogeneous vegetation and elevation
[AD-A117409] N82-33802

SURFACE TEMPERATURE
Some practical aspects on the infra-red thermography of buildings
[PB82-174517] N82-33576

SURFACE WATER
Active microwave remote sensing research program plan. Recommendations of the Earth Resources Synthetic Aperture Radar Task Force --- application areas: vegetation canopies, surface water, surface morphology, rocks and soils, and man-made structures
[NASA-CR-167726] N82-33596
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813

SURGES
Data compression for transient measurements
[AD-A117100] N82-34093

SURVEYS
Engineering geology and geomorphology of streambank erosion. Report 3: The application of waterborne geophysical techniques in fluvial environments
[AD-A115678] N82-33892

SURVIVAL
Extensional collapse modes of structural members N82-33765

SWITCHES
The 1200-kV system study
[DE82-014512] N82-33659

SYMBOLS
Nonalgebraic symbol manipulators for use in scientific and engineering modeling: Introducing the FORSE (FORTRAN Symbol Expander)
[DE82-009818] N82-34118

SYMMETRICAL BODIES
Susceptibility of symmetric structures to nonlinear torsional coupling N82-33759

SYMMETRY
A finite element approach for shells of revolution with a local deviation N82-33756
Average beta value of axially symmetric plasma
[IPPJ-586] N82-34252

SYNCHRONISM
Timing subsystem development
[AD-A117609] N82-33647
A synchronous phase detection system for an optical interferometric sensor
[AD-A117435] N82-34229

SYNCHROTRON RADIATION
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic paricles
[NASA-CR-169416] N82-34197
Triply differential studies of atomic and molecular photoionization using synchrotron radiation
[AD-A117247] N82-34198

SYNTAX
A summary discussion of CONLAN
[AD-A117461] N82-34113

SYNTHESIS (CHEMISTRY)
Studies on the syntheses of boron hydride systems
[AD-A115817] N82-33467
Moessbauer spectroscopic and related characterization of Fischer-Tropsch catalysts
[DE82-009280] N82-33476
Development of host crystals for Ce(+3) blue and blue-green solid-state lasers
[AD-A117899] N82-33710

SYSTEM FAILURES
Bayes adaptive estimation of the point of shift to the wear-out phase of reliability systems
[AD-A117865] N82-33725

SYSTEMS ANALYSIS
System identification: A question of uniqueness, revisited N82-33763
The Georgia Institute of Technology research program in fully distributed processing systems
[AD-A116955] N82-34089
Comparing coherent systems
[AD-A116813] N82-34162

SYSTEMS INTEGRATION
Integrated systems of automatic radio equipment
[AD-A115670] N82-33602

SYSTEMS SIMULATION
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 1: Study results
[NASA-CR-165975] N82-34129
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation, volume 2, part 1. Appendix A: Software documentation
[NASA-CR-165976] N82-34130
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 2, Part 2: Appendixes B, C, D and E
[NASA-CR-165977] N82-34131

SYSTEMS STABILITY
Constrained multibody system dynamics: An automated approach N82-33762

T

TABLES (DATA)
Water resources data for Arkansas, water year 1980
[PB82-190380] N82-33818
Water resources data for Pennsylvania, water year 1980. Volume 1: Delaware River Basin
[PB82-190372] N82-33819
Water resources data for Oregon, water year 1980. Volume 2: Western Oregon
[PB82-190364] N82-33820
Water resources data for Louisiana, water year 1981. Volume 3: Coastal Louisiana
[PB82-188202] N82-33821
Identification of energy conservation research opportunities: A review and synthesis of the literature
[DE82-015028] N82-33875
Solar-geophysical data prompt reports, number 446. Part 1: Data for September 1981, August 1981 and late data. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-171075] N82-34331
Solar-geophysical data prompt reports, number 447. Part 1: Data for October 1981, September 1981 and late date. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-177726] N82-34332
Solar-geophysical data comprehensive reports, number 447. Part 2: Data for May 1981, February 1980 and miscellanea. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-177734] N82-34333

TACTILE DISCRIMINATION
Computer graphic representation of remote environment using position tactile sensors
[AD-A116912] N82-34111

TAKEOFF
Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system
[AD-A117141] N82-33407
Application of a pilot control strategy identification technique to a joint FAA/NASA ground-based simulation of head-up displays for CTOL aircraft N82-34061

TALKING
A conversational test for comparing voice systems using working two-way communication links
[AD-A116054] N82-33599

TANKS (COMBAT VEHICLES)
Microclimate cooling for combat vehicle crewmen
[AD-A117156] N82-34083

TAPERING
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357

TARGET ACQUISITION
Alternative employment concepts for Remotely Piloted Vehicle (RPV) FLIR/TV mission payload
[AD-A117877] N82-33379
Active imaging of range targets at 1.2 millimeters
[AD-A117161] N82-33611
Modeling human target acquisition in ground-to-air weapon systems N82-34040
Photonic seeker development
[AD-A117160] N82-34225

TARGET RECOGNITION
Investigation into Air Launch Cruise Missile (ALCM) flight information loading and display techniques during flex targeting procedure
[AD-A115744] N82-33376
Evaluation of SMART sensor displays for multidimensional precision control of Space Shuttle remote manipulator N82-34074
A program to study the detection of target hits by directed energy weapons
[AD-A117711] N82-34213
Preliminary assessment of US Coast Guard Short Range Recovery (SRR) Forward Looking Infrared (FLIR) system small target detection performance
[AD-A117916] N82-34230

TARGETS
Mercury cadmium telluride sputtered target research
[AD-A117456] N82-33572
Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-34067

TASK COMPLEXITY
Sixteenth Annual Conference on Manual Control
[NASA-TM-84273] N82-34037
Effect of counting and tracking on verbal and production methods of time estimation N82-34049
Experimental investigation of programming complexity in COBOL
[AD-A116811] N82-34108

TASKS
PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066
Supervision of dynamic systems: Monitoring, decision-making and control N82-34069

TEAMS
Experimental analysis of team performance: Methodological developments and research results
[AD-A116915] N82-34034

TECHNICAL WRITING
Survey of reader preferences concerning the format of NASA technical reports
[NASA-TM-84502] N82-34300

TECHNOLOGY ASSESSMENT
Technical evaluation: Pressurized fluidized-bed combustion technology
[DE82-014903] N82-33487
Characterization of coal-derived liquids and other fossil-fuel-related materials employing mass spectrometry
[DE82-015005] N82-33558
Optimal planning and execution of DOD VLSI activities
[AD-A117238] N82-33641
Assessment of a coal-gasification fuel-cell system for utility application
[DE82-903667] N82-33870
Assessment of energy saving technologies with potential for applications in US industries
[DE82-012571] N82-33874
Human capital adjustments to technological change in the computer industry: The case of scientists and engineers
[PB82-180969] N82-34036

TECHNOLOGY TRANSFER
Technology transfer in New Mexico
[GPO-85-343] N82-34309

TECHNOLOGY UTILIZATION
Design of automated systems for control of technological processes in large scale microbiological industry with use of microprocesors N82-33990

TECTONICS
Platonic plate tectonics: On the regularity of the distribution of triple points on the Earth's surface
[AD-A113777] N82-33931

TELEOPERATORS
Experimental evaluation of the concept of supevisory manipulation N82-34073

TELEVISION TRANSMISSION
INTELSAT V-E(F-5)
[NASA-TM-84857] N82-33413

TEMPERATE REGIONS
Prospective significance of temperate-zone carbon pool transients, 1980 - 2010
[DE82-011866] N82-33896

TEMPERATURE
Thermal effects in rolling/sliding contact
[AD-A117702] N82-33719

TEMPERATURE COMPENSATION
Use of the Charge/Discharge (C/D) ratio to aument voltage limit (V sub T) charge control in the ERBS spacecraft
[NASA-TM-83991] N82-33824

TEMPERATURE DEPENDENCE
Accelerated fatigue durability of a high performance composite
[NASA-CR-166407] N82-33437
Thermal conductivity of electroless nickel-phosphorus alloy plating
[DE82-013529] N82-33510

TEMPERATURE DISTRIBUTION
Weld thermal simulator
[PB82-207283] N82-33583
Development of a direct-absorption high-temperature gas receiver
[DE82-010168] N82-33838
Ocean thermal energy conversion, fiscal year 1981. Public Law 96-320 N82-33888

TEMPERATURE EFFECTS
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N82-33436

Hot tensile tests of Inconel 718
[NASA-CR-162089] N82-33496
Low temperature tests of rescue breathing apparatus
[PB82-172727] N82-34086
Structure of field rotating disturbances in warm plasma
[NASA-CR-169359] N82-34256

TEMPERATURE GRADIENTS
The development of a thermal distortion code using the finite element method
[AD-A116868] N82-33766

TEMPERATURE MEASUREMENT
Some practical aspects on the infra-red thermography of buildings
[PB82-174517] N82-33576

TEMPERATURE PROFILES
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672

TEMPERATURE SENSORS
Design and laboratory testing of a prototype linear temperature sensor
[AD-A117245] N82-33688

TEMPORAL DISTRIBUTION
Spatial distributions of phytoplankton: Limitations of power spectrum techniques N82-33968

TENSILE STRENGTH
Prediction of residual tensile strength of transversely impacted composite laminates N82-33745

TENSILE STRESS
Elastic/plastic finite element analysis of a single edge-cracked beam subjected to mode 1 tensile loading
[AD-A117622] N82-33773

TENSILE TESTS
Hot tensile tests of Inconel 718
[NASA-CR-162089] N82-33496

TERMINAL BALLISTICS
A fracture and ballistic penetration resistant laminate
[AD-A117142] N82-33439

TERMINAL FACILITIES
Study of the frequency assignment congestion in the ultra high frequency air traffic control air/ground communication band
[AD-A117640] N82-33368

TERMINOLOGY
NATO glossary of terms and definitions (English and French)
[AD-A117715] N82-34290

TERRAIN
Effect of ground terrain on millimeter wave propagation
[AD-A116837] N82-33614
Separation monitoring with four types of predictors on a cockpit display of traffic information N82-34063
Interactive digital image processing for terrain data extraction
[AD-A116881] N82-34107

TERRAIN FOLLOWING AIRCRAFT
Terrain following/terrain avoidance system concept development N82-33363

TEST EQUIPMENT
New pressure test for determining coefficient of permeability of rock masses
[AD-A116982] N82-33927

TEST FACILITIES
Electronic tester study
[DE82-016028] N82-33657
The aerospace long-path multiple reflection cell facility
[SD-TR-82-60] N82-34218

TEST STANDS
China's newly designed and built aircraft engine test stand
[AD-A117569] N82-33410

TESTS
Stress, anxiety, and cognitive interference: Reactions to tests
[AD-A113564] N82-34031

TETHERED BALLOONS
Analysis of a kite anemometer
[DE82-009058] N82-33691

TEXAS
Calderas and mineralization: Volcanic geology and mineralization in the Chianti caldera complex, Trans-Pecos Texas
[DE82-013263] N82-33941

TEXTURES
Surface texturing of fluoropolymers
[NASA-CASE-LEW-13028-1] N82-33521
An analysis of the max-min texture measure
[AD-A116768] N82-33799
Natural processes influencing terrain attributes. Report 1: Prediction of residual soil texture in humid temperature climates of the Federal Republic of Germany and selected analogous portions of the United States, pilot study
[AD-A116939] N82-33926
Optical flow and texture variables useful in simulating self motion
[AD-A117016] N82-34081

THEMATIC MAPPING
The use of LANDSAT data to monitor the urban growth of Sao Paulo Metropolitan area
[E82-10294] N82-33793

THEOREMS
Palm's theorem for nonstationary processes
[AD-A117089] N82-34135
Central limit theorems in the area of large deviations for some dependent random variables
[AD-A117714] N82-34155

THERAPY
Hyperthermia heating apparatus --- cancer therapy
[NASA-CASE-NPO-14549-2] N82-33996

THERMAL CONDUCTIVITY
Three-dimensional thermal analysis for a conceptual high-level waste repository in welded tuff
[DE82-015503] N82-34217

THERMAL CYCLING TESTS
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501

THERMAL DEGRADATION
A laboratory model for the evaluation of the toxic natures of combustion products
[RAE-TRANS-2083] N82-33464

THERMAL EMISSION
Einstein Observatory solid state spectrometer observations of M87 and the Virgo cluster
[NASA-TM-83946] N82-34314

THERMAL ENERGY
Study of the fundamental thermal-management aspects of the lithium-aluminium/iron sulfide battery
[DE82-014441] N82-33871

THERMAL ENVIRONMENTS
Design and evaluation of a pressure sensor for high temperature nuclear application
[EGG-2135] N82-33682

THERMAL EXPANSION
The development of a thermal distortion code using the finite element method
[AD-A116868] N82-33766

THERMAL FATIGUE
Thermal fatigue behavior of FP alumina/magnesium composites
[AD-A117292] N82-33440

THERMAL INSULATION
Advanced carbon fabric/phenolics for thermal protection applications
[AD-A116829] N82-33534
Home retrofitting for energy conservation and solar considerations
[DE82-013420] N82-33860

THERMAL SIMULATION
Weld thermal simulator
[PB82-207283] N82-33583

THERMAL STABILITY
Method of evaluating the thermal stability of the pyroelectric properties of polyvinylidene fluoride effects of poling temperature and field
[AD-A117388] N82-33536
Application of the reduced basis method to nonlinear transient thermal analysis N82-33743
On the thermal stability of coronal loop plasma
[NASA-CR-169347] N82-34327

THERMITES
Aluminum/cuprous oxide thermite
[DE82-012866] N82-33514

THERMOCHEMISTRY
Thermal desorption of H2 and CO on Pt/TiO2
[AD-A117888] N82-33466
The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A117080] N82-33549
Thermochemical water-splitting for hydrogen production
[PB82-208174] N82-33560
Development of a long-life high-temperature catalyst for the SO2/SO3 energy-storage system
[DE82-009723] N82-33840

THERMOCLINES
Design and laboratory testing of a prototype linear temperature sensor
[AD-A117245] N82-33688

THERMODYNAMIC CYCLES
Residual energy application program: Utilization of high-temperature waste heat by means of Rankine-cycle engines. A technical summary
[DE82-010376] N82-33839

THERMODYNAMIC EFFICIENCY
Thermochemical water-splitting for hydrogen production
[PB82-208174] N82-33560

THERMODYNAMIC PROPERTIES
Thermal effects in rolling/sliding contact
[AD-A117702] N82-33719

THERMODYNAMICS
Mechanisms affecting mass transfer in fuel cells
[DE82-013431] N82-33876

THERMOELASTICITY
The development of a thermal distortion code using the finite element method
[AD-A116868] N82-33766

THERMOPLASTIC RESINS
LARC-TPI: A multi-purpose thermoplastic polyimide
[NASA-TM-84516] N82-33530

THETA PINCH
Simplified scaling model for the THETA-pinch
[DE82-009962] N82-34273

THICKNESS RATIO
An inviscid computational method for tactical missile configurations
[AD-A116904] N82-33415
Pavement thickness, surface evenness and construction practice
[PB82-202599] N82-33586
Computation of two-dimensional turbulent flow at subsonic Mach numbers over thick trailing edges
[NASA-TM-84278] N82-33663

THIN FILMS
Rapid quenching effects in PVC films
[NASA-CR-169350] N82-33524
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-009398] N82-33842
Growth of HgCdTe by modified molecular beam epitaxy
[AD-A117752] N82-34199
Ultraviolet enhanced deposition from pentacarbonyl-iron on gallium arsenide, quartz, and sapphire
[AD-A116800] N82-34278

THIN WALLED SHELLS
A mixed formulation finite element for linear thin shell analysis N82-33753
A finite element approach for shells of revolution with a local deviation N82-33756

THIOLS
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542

THOMSON SCATTERING
Thomson scattering on the PRETEXT Tokamak
[DE82-009085] N82-34262
Multi-point Thomson scattering
[DE82-014385] N82-34270
Summary of Thomson-scattering data from the Tandem Mirror Experiment (TMX)
[DE82-014956] N82-34272

THREE DIMENSIONAL FLOW
Acta Mechanica Sinica (selected articles)
[AD-A115834] N82-33665

THREE DIMENSIONAL MOTION
A three-dimensional stability analysis/design program (3DSAD). Report 3. General Analysis Module (CGAM)
[AD-A117387] N82-33772
Three-dimensional velocity structure of the crust and upper mantle beneath the Nevada test site
[AD-A114241] N82-33932

THRUST
The analysis for regulation performance of a variable thrust rocket engine control system
[AD-A117495] N82-33429

THRUST AUGMENTATION
Augmentor stability management program
[AD-A117926] N82-33428

THRUST BEARINGS
The development of a thermal distortion code using the finite element method
[AD-A116868] N82-33766

TIDES
High precision tidal gravity
[AD-A116941] N82-33934
Atlantic coast water-level climate
[AD-A117147] N82-33951
Modeling and adjusting global ocean tides using SEASAT altimeter data
[AD-A115841] N82-33972

TILES
Mechanical fastener
[NASA-CASE-LAR-12738-1] N82-33419
Method for repair of thin glass coatings --- on space shuttle orbiter tiles
[NASA-CASE-KSC-11097-1] N82-33520

TIME DEPENDENCE
System optimization by periodic control
[AD-A117815] N82-33402
The structure and growth of the mixing layer region of a round jet
[SU-TF-17] N82-33664

TIME DISCRIMINATION
Effect of counting and tracking on verbal and production methods of time estimation N82-34049

TIME LAG
A comparison of control modes for time-delayed remote manipulation N82-34072
TIME RESPONSE
Pilot model hypothesis testing N82-34047
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities N82-34052
TIME SERIES ANALYSIS
Statistical analysis of upper ocean time series of vertical shear
[AD-A117286] N82-33969
Modeling of human operator dynamics in simple manual control utilizing time series analysis --- tracking (position) N82-34038
Extensions of some models for positive-valued time series
[AD-A115754] N82-34138
Time series model identification, spectral estimation and functional inference
[AD-A117073] N82-34146
Autoregressive spectral estimation and functional inference
[AD-A117113] N82-34173
Autoregressive spectral estimation
[AD-A117266] N82-34174
Maximum entropy interpretation of autoregressive spectral densities
[AD-A117263] N82-34175
Spectral equivalence of deterministic and stochastic models for time series with a periodic component
[AD-A117718] N82-34179
TIME SHARING
The effect of stimulus-central processing-response compatibility and resource competition on pilot performance
[AD-A113754] N82-34032
TIMING DEVICES
A new analysis of the unwinding ribbon as a delayed arming device
[AD-A117352] N82-33571
A SPICE2 model for the M732 analog timer integrated circuit
[AD-A117012] N82-33643
Timing subsystem development
[AD-A117609] N82-33647
TIMOSHENKO BEAMS
Analytical and experimental investigations of bimodular composite beams
[AD-A117945] N82-33778
TIN
Blended elemental titanium alloys
[DE82-012882] N82-33513
Arc-sprayed metals for structural electromagnetic shielding
[AD-A117673] N82-33629
TIN ALLOYS
Studies on age-hardening in spinodally modulated alloys, experimental and theoretical
[DE82-007957] N82-33506
TIRES
On the road performance tests of electric test vehicle for correlation with road load simulator
[NASA-TM-82900] N82-33829
TISSUES (BIOLOGY)
Bioelectric fields: Their sources, nature and purpose N82-33991
Development of nitrogen sensor for determination of PN(2) in body tissues
[AD-A116607] N82-34005
Oxygen transport to human tissues
[AD-A115904] N82-34007
TITANIUM
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium
[AD-A117814] N82-33541
TITANIUM ALLOYS
Fracture and fatigue characteristics in titanium alloys
[AD-A117155] N82-33499
The effect of carbon and boron on the friction behavior of Ti-implanted 52100 bearing steel at low sliding speeds
[AD-A117742] N82-33500
Studies of metal: Semiconductor interfaces in catalysis and energy conversion
[DE82-011863] N82-33509
Blended elemental titanium alloys
[DE82-012882] N82-33513
The fatigue notch factor revisited
[TAE-446] N82-33732
Improved damage tolerance of titanium by adhesive lamination
[NASA-TM-84525] N82-33737
An example of the effect of hydrogen trapping on hydrogen embrittlement
[AD-A116299] N82-34106
TITANIUM CARBIDES
All coated limited experiment in the JIPP T-II Tokamak
[IPPJ-593] N82-34241
TITANIUM OXIDES
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472
Mullite-titanium dioxide solid solutions
[DE82-009031] N82-34288
TOKAMAK DEVICES
Formation of magnetic islands and ergodic magnetic layers in wall-lapping plasma as a non-divertor concept for a reactor-relevant Tokamak
[IPPJ-587] N82-34238
Probe measurements for impurity transport in the scrape-off layer of JIPP T-II
[IPPJ-590] N82-34239
All coated limited experiment in the JIPP T-II Tokamak
[IPPJ-593] N82-34241
Wall material characteristics in reacting plasma modelling
[IPPJ-592] N82-34242
Wall conditioning of the JIPP T-II Torus by ac discharge cleaning
[IPPJ-595] N82-34246
Transport code study of electron cyclotron heating in Tokamaks
[IPPJ-582] N82-34249
The 1981 magnetic-fusion theory program project summaries
[DE82-008102] N82-34260
Thomson scattering on the PRETEXT Tokamak
[DE82-009085] N82-34262
Tokamak confinement experiments
[DE82-009301] N82-34265
Fusion engineering device. Volume 1: Mission and program summary
[DE82-008931] N82-34267
Suppression of plasma formation in waveguide antennas for lower-hybrid heating
[DE82-014392] N82-34269
Fusion engineering device. Volume 3: Test plan
[DE82-008933] N82-34274
Fusion engineering device. Volume 4: Physics basis and physics R and D requirements
[DE82-008934] N82-34275
Fusion engineering device. Volume 5: Technology R and D requirements for construction
[DE82-008936] N82-34276
TOLERANCES (PHYSIOLOGY)
Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994
TOPOGRAPHY
Guidelines for siting WECS relative to small-scale terrain features
[DE82-009124] N82-33847
TOPOLOGY
Storage-efficient method for construction of a Thiessen triangulation
[DE82-014571] N82-34117
TOROIDAL PLASMAS
Formation of relativistic electron beam rings in a conducting cavity
[IPPJ-583] N82-34237
Evolution of ring current formed by relativistic electron beam injection into a charge but not current neutralizing plasma
[IPPJ-576] N82-34247
Simplified scaling model for the THETA-pinch
[DE82-009962] N82-34273
TORSION
Application of a boundary element method to the study of dynamical torsion of beams N82-33747
Dynamic response of vertebral elements response of the intervertebral joint to torsion
[AD-A115125] N82-34016
TORSIONAL STRESS
Susceptibility of symmetric structures to nonlinear torsional coupling N82-33759
TORSO
Effectiveness of ice (water) packets vests in reducing heat stress
[AD-A117864] N82-34021
TOUGHNESS
Development of tough, moisture resistant laminating resins
[NASA-CR-3615] N82-33432
Effect of specimen size on the fracture toughness of Type 304 stainless steel
[DE82-012517] N82-33517
KQ measurements with rheometrics mechanical spectrometer
[AD-A117903] N82-33781
TOXIC HAZARDS
A laboratory model for the evaluation of the toxic natures of combustion products
[RAE-TRANS-2083] N82-33464
Formaldehyde and other aldehydes
[PB82-180498] N82-33909
New data on metabolism and action mechanism of mycotoxins N82-33989
Toxicity of silicon compounds
[DE82-014245] N82-34022
TOXICITY
An apparatus for the measurement of pulmonary function in unanesthetized small animals
[AD-A114938] N82-33985
TOXINS AND ANTITOXINS
New data on metabolism and action mechanism of mycotoxins N82-33989
TRACKING (POSITION)
Active imaging of range targets at 1.2 millimeters
[AD-A117161] N82-33611
A gunner model for an AAA tracking task with interrupted observations N82-34039
The effects of multiplicative motor noise on the optimal human operator model N82-34042
A computer simulation approach to measurement of human control strategy N82-34046
TRACKING PROBLEM
Pilot model hypothesis testing N82-34047
Effect of counting and tracking on verbal and production methods of time estimation N82-34049
A performance analysis study of a complex G field experiment N82-34056
TRAFFIC CONTROL
Effects of motivation on car-following N82-34070
Levels of steering control: Reproduction of steering-wheel movements N82-34071
TRAILING EDGES
Computation of two-dimensional turbulent flow at subsonic Mach numbers over thick trailing edges
[NASA-TM-84278] N82-33663
TRAINING ANALYSIS
Structures of memory for critical flight information
[AD-A116510] N82-34028
TRAINING EVALUATION
An Operational evaluation of head up displays for civil transport operations. NASA/FAA phase 3 report
[NASA-TP-1815] N82-33381
Structures of memory for critical flight information
[AD-A116510] N82-34028
Human capital adjustments to technological change in the computer industry: The case of scientists and engineers
[PB82-180969] N82-34036
Training aircraft design considerations based on the successive organization of perception in manual control N82-34043
Does man always close the loop in trying to pilot a large ship? N82-34068
TRAJECTORIES
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354
Navier-Stokes computations for conventional and hollow projectile shapes at transonic velocities
[AD-A116866] N82-33355
Study of an automatic trajectory following control system
[NASA-CR-169361] N82-33399
TRAJECTORY CONTROL
Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-34060
TRANSDUCERS
Development and test of a digital/optical linear position transducer
[AD-A117918] N82-34231
TRANSFORMATIONS (MATHEMATICS)
The G-spectral estimator
[AD-A116942] N82-34144
Logarithmic derivatives of two normalizing functions
[AD-A117516] N82-34180
Lax-pair operators for squared eigenfunctions in the inverse scattering transformations
[IPPJ-589] N82-34244
Alternative representations of the inverse scattering transformation for the K-d V equation and the modified K-d equation
[IPPJ-581] N82-34248
TRANSIENT RESPONSE
Application of the reduced basis method to nonlinear transient thermal analysis N82-33743
Preprocessing techniques in transient analysis
[AD-A116860] N82-34143
TRANSITION FLOW
Acta Mechanica Sinica (selected articles)
[AD-A115634] N82-33665

TRANSMISSION LINES
Dielectric waveguide antenna
[AD-A117305] N82-33609
TRANSMISSION LOSS
Estimates of crustal transmission losses using MLM array processing
[AD-A117278] N82-33929
IFD: An implicit finite-difference computer model for solving the parabolic equation
[AD-A117701] N82-34156
TRANSONIC FLOW
Finite difference modeling of rotor flows including wake effects
[NASA-TM-84280] N82-33345
Recent applications of the transonic wing analysis computer code, TWING
[NASA-TM-84283] N82-33346
An experimental study of the transonic equivalence rule with lift
[AD-A117019] N82-33350
Computations of projectile Magnus effect at transonic velocities
[AD-A117313] N82-33353
TRANSONIC FLUTTER
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[NASA-TM-83276] N82-33736
TRANSONIC WIND TUNNELS
Cryogenic wind tunnels: A selected, annotated bibliography
[NASA-TM-84474] N82-33405
TRANSPORT AIRCRAFT
A model-based technique for predicting pilot opinion ratings for large commercial transports N82-34050
TRANSPORT PROPERTIES
Probe measurements for impurity transport in the scrape-off layer of JIPP T-II
[IPPJ-590] N82-34239
Wall material characteristics in reacting plasma modelling
[IPPJ-592] N82-34242
Transport code study of electron cyclotron heating in Tokamaks
[IPPJ-582] N82-34249
TRANSPORT THEORY
Variational analysis and approximate solutions for transport phenomena
[AD-A117110] N82-34147
TRANSPORTATION
Extensional collapse modes of structural members N82-33765
TRANSVERSE ACCELERATION
Responses to harmonic acceleration with varying head positions
[AD-A114736] N82-34010
Modeling lateral acceleration effects on pilot performance N82-34058
TRANSVERSE OSCILLATION
Plate vibration research, 1976-1980: Complicating effects N82-33729
TRANSVERSE WAVES
The effects of transverse gradient of static magnetic wigglers on the free electron laser
[AD-A116968] N82-33704
TRAVELING SALESMAN PROBLEM
An O(NlogN) planar travelling salesman heuristic based on spacefilling curves
[AD-A115357] N82-34136
TRAVELING WAVE AMPLIFIERS
Three-dimensional velocity structure of the crust and upper mantle beneath the Nevada test site
[AD-A114241] N82-33932
TRAVELING WAVE MODULATION
An analysis of current drive by travelling wave based on theory of intrinsic stochasticity
[IPPJ-575] N82-34235
TRAVELING WAVES
An analysis of current drive by travelling wave based on theory of intrinsic stochasticity
[IPPJ-575] N82-34235
TREES (MATHEMATICS)
Octree generation, analysis and manipulation
[AD-A117450] N82-34112
TRENDS
Air quality trends in Region 8, 1980 data
[PB82-204074] N82-33910
TRIANGLES
Implementation of a C-1 triangular element based on the P-version of the finite element method N82-33749
TRIANGULATION
Storage-efficient method for construction of a Thiessen triangulation
[DE82-014571] N82-34117
TRITIUM
Testing of tritium-powered runway distance and taxiway markers
[AD-A114558] N82-33408
TROPOSPHERE
Measurement of tropospheric carbonyl sulfide by microwave spectrometry
[NASA-CR-169417] N82-33920
TUMORS
Some computer applications and digital image processing in nuclear medicine N82-34000
TUNABLE LASERS
Continuously-tunable high-repetition rate RF-excited CO2 waveguide laser
[NDRC/PUBL-82/1002] N82-33695
TUNNELS
Dynamic response of lined tunnels by boundary elements N82-33755
TURBIDITY
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
TURBINE BLADES
Advanced ceramic coating development for industrial/utility gas turbines
[NASA-CR-169852] N82-33494
Broad band sound from wind turbine generators
[NASA-CR-165810] N82-34187
TURBINES
The CF6 jet engine performance improvement: Low pressure turbine active clearance control
[NASA-CR-165557] N82-33393
Stress corrosion characterization of turbine rotor materials, phase 1
[DE82-902070] N82-33508
TURBOCOMPRESSORS
Flow phenomena in compressor casing treatment
[CUED/A-TURBO/TR-112] N82-33661
TURBOFAN ENGINES
The CF6 jet engine performance improvement: Low pressure turbine active clearance control
[NASA-CR-165557] N82-33393
Augmentor stability management program
[AD-A117926] N82-33428
Circumferentially segmented duct lines optimized for axisymmetric and standing wave sources — reducing noise from turbofan engines galerkin method acoustic attenuation
[NASA-TP-2075] N82-34190
TURBOMACHINERY
Preliminary design and economic investigations of Diffuser Augmented Wind Tubines (DAWT)
[DE82-008475] N82-33854
TURBOPROP ENGINES
Advanced turboprop testbed systems study
[NASA-CR-167895] N82-33375
Ceramic gas turbine engine demonstration program
[AD-A117088] N82-33395
TURBULENT BOUNDARY LAYER
Study of periodic turbulent pipe flow
[PB82-201534] N82-33680
TURBULENT DIFFUSION
Turbulent diffusion studies of winter storms over the Sierra Nevada Mountains
[PB82-178898] N82-33965
TURBULENT FLOW
Trailing vortices in stratified fluids
[AD-A117040] N82-33352
Computation of two-dimensional turbulent flow at subsonic Mach numbers over thick trailing edges
[NASA-TM-84278] N82-33663
Separated diffuser flow analysis, volume 1
[AD-A117668] N82-33669
In-situ measurement of particulate in turbulent duct flows
[DE82-010291] N82-33671
An assessment of heat-transfer correlations for turbulent water flow through a pipe at Prandtl numbers of 6.0 and 11.6
[DE82-014426] N82-33677
TURBULENT MIXING
The structure and growth of the mixing layer region of a round jet
[SU-TF-17] N82-33664
A theoretical appraisal of the joint effects of turbulence and of Langmuir circulations on the dispersion of oil spilled in the sea
[AD-A117844] N82-33894
TWISTED WINGS
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357
TWO DIMENSIONAL BODIES
Some vibrating membrane equations for the linear estimation of two dimensional isotropic random fields
[AD-A116959] N82-33770
TWO DIMENSIONAL FLOW
Supersonic cascade flows with subsonic axial Mach number
[CUED/A-TURBO/TR-110] N82-33343
Computation of two-dimensional turbulent flow at subsonic Mach numbers over thick trailing edges
[NASA-TM-84278] N82-33663
Two dimensional viscous flow of a compressible fluid
[AD-A116913] N82-33667

U

ULTRAHIGH FREQUENCIES
Study of the frequency assignment congestion in the ultra high frequency air traffic control air/ground communication band
[AD-A117640] N82-33368
ULTRASONIC FLAW DETECTION
Development of nondestructive testing technique. Ultrasonic testing and radiographic testing
[DE82-700448] N82-33726
ULTRASONIC TESTS
Ultrasonic measurement of case depth in case hardened steels. Evaluation of feasibility for the ultrasonic measurement of case depth in case hardened steels
[AD-A117901] N82-33505
Compressibility of colloids. 1: Compressibility studies of aqueous solutions of amphibilic polymers and their adsorbed state on Polystyrne latex dispersions by ultrasonic velocity measurements
[AD-A117416] N82-33538
Comparison between shear wave ultrasonic examination and radiographic examination of some austenitic stainless steel pipe welds
[PB82-207267] N82-33584
Advanced nondestructive evaluation (ultrasonic pulser/receiver technology)
[AD-A117841] N82-33724
ULTRAVIOLET PHOTOMETRY
Multichannel VUV rocketborne monochromator for low-level auroral measurements
[AD-A115815] N82-34220
ULTRAVIOLET RADIATION
Ultraviolet-radiation-curable paints
[DE82-015717] N82-33545
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899
ULTRAVIOLET SPECTRA
Ultraviolet and X-ray detection of the 56 Peg system (KO 2p + WD)
[NASA-CR-169351] N82-34317
The structure, energy balance, and winds of cool stars
[NASA-CR-169356] N82-34318
UNDERGROUND STORAGE
Vapor condensation control of JP-4 emissions from underground storage tanks at March Air Force Base, California
[AD-A117875] N82-33554
Underground scanning with an impulse radar
[DE82-015495] N82-33630
Geotechnical issues and guidelines for storage of compressed air in excavated hard rock caverns
[DE82-015027] N82-33872
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary
[DE82-008345] N82-33877
Environmental assessment model for shallow land disposal of low-level radioactive wastes
[DE82-001830] N82-34214
Three-dimensional thermal analysis for a conceptual high-level waste repository in welded tuff
[DE82-015503] N82-34217
UNDERGROUND TRANSMISSION LINES
Evaluation of underground dc transmission systems
[DE82-012312] N82-33660
UNDERWATER ACOUSTICS
Studies of the propagation of elastic waves in fluids and solids
[AD-A117370] N82-33616
IFD: An implicit finite-difference computer model for solving the parabolic equation
[AD-A117701] N82-34156
UNDERWATER ENGINEERING
Effect of local vibration on divers working under water N82-33992
UNDERWATER PHYSIOLOGY
Effect of local vibration on divers working under water N82-33992

UNITED KINGDOM
United Kingdom mineral statistics 1980 .
[PB82-172362] N82-33817
UNIVERSITY PROGRAM
USAF Summer Faculty Research Program. Volume 1: 1981 research reports
[AD-A113708] N82-34340
USAF Summer Faculty Research Program. Volume 2: 1981 research reports
[AD-A113709] N82-34341
UNSTEADY FLOW
Trailing vortices in stratified fluids
[AD-A117040] N82-33352
The analysis for regulation performance of a variable thrust rocket engine control system
[AD-A117495] N82-33429
Acta Mechanica Sinica (selected articles)
[AD-A115634] N82-33665
Interaction of oscillations of channel flow and flow separation at duct discontinuities
[AD-A116801] N82-33666
Study of periodic turbulent pipe flow
[PB82-201534] N82-33680
Vortex shedding from cylinders and the resulting unsteady forces and flow phenomenon, part 1
N82-34338
UPPER ATMOSPHERE
TMA chemical release payloads for stratospheric wind measurements auroral E program and related programs
[AD-A115832] N82-33921
URANIUM
Airborne gamma-ray spectrometer and magnetometer survey: Alturas Quadrangle, California
[DE82-005539] N82-33805
Grand Junction Area Office, United States Department of Energy 1980/1981 activities report
[DE82-009638] N82-33806
URBAN DEVELOPMENT
The use of LANDSAT data to monitor the urban growth of Sao Paulo Metropolitan area
[E82-10294] N82-33793
URBAN PLANNING
The use of LANDSAT data to monitor the urban growth of Sao Paulo Metropolitan area
[E82-10294] N82-33793
USER MANUALS (COMPUTER PROGRAMS)
User's manual for interfacing a leading edge, vortex rollup program with two linear panel methods
[NASA-TM-78584] N82-33340
A survey of ionospheric models: A preliminary report on the development of an ionospheric model thesaurus and users guide
[AD-A117659] N82-33935
Users guide for SOL/QPSOL: A FORTRAN package for quadratic programming
[AD-A117607] N82-34114
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation, volume 2, part 1. Appendix A: Software documentation
[NASA-CR-165976] N82-34130
USER REQUIREMENTS
A survey of ionospheric models: A preliminary report on the development of an ionospheric model thesaurus and users guide
[AD-A117659] N82-33935
A system for assessing user response to NAVPERRANDCEN RDT/E products
[AD-A117719] N82-34297
Survey of reader preferences concerning the format of NASA technical reports
[NASA-TM-84502] N82-34300
UTILITIES
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859
Basic techniques in availability engineering
[DE82-903666] N82-34298

V

V/STOL AIRCRAFT
Recent progress in VSTOL technology
[NASA-TM-84238] N82-33334
VACUUM CHAMBERS
Method for sequentially processing a multi-level interconnect circuit in a vacuum chamber
[NASA-CASE-MFS-15670-1] N82-33634
The aerospace long-path multiple reflection cell facility
[SD-TR-82-60] N82-34218
VAN DE GRAAFF ACCELERATORS
The examination of electrical-breakdown properties of insulating gases used in electrostatic accelerators
[DE82-009106] N82-33654
VANADIUM
Blended elemental titanium alloys
[DE82-012882] N82-33513
VAPOR DEPOSITION
Thermal desorption of H2 and CO on Pt/TiO2
[AD-A117888] N82-33466
Large plate CdTe synthesis by sealed vessels transport
[AD-A117524] N82-34286
VAPOR PHASES
Research on sources of gas phase metastable atoms and molecules
[AD-A117672] N82-34201
VAPORS
Vapor condensation control of JP-4 emissions from underground storage tanks at March Air Force Base, California
[AD-A117875] N82-33554
VARIATIONS
The analysis for regulation performance of a variable thrust rocket engine control system
[AD-A117495] N82-33429
VECTOR ANALYSIS
Vectorized sparse elimination
[AD-A117112] N82-34094
Asymptotic and numerical methods for vector systems of singularly-perturbed boundary value problems
[AD-A117111] N82-34141
VEGETATION
Terrestrial biological inventory, Hillview Drainage and Levee District, Greene and Scott Counties, Illinois
[AD-A115911] N82-33800
The roughness lengths associated with regions of heterogeneous vegetation and elevation
[AD-A117409] N82-33802
VEHICLES
Extensional collapse modes of structural members
N82-33765
VELOCITY
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
Mechanisms affecting mass transfer in fuel cells
[DE82-013431] N82-33876
Three-dimensional velocity structure of the crust and upper mantle beneath the Nevada test site
[AD-A114241] N82-33932
Effects of motivation on car-following N82-34070
Structure of field rotating disturbances in warm plasma
[NASA-CR-169359] N82-34256
VELOCITY DISTRIBUTION
The structure and growth of the mixing layer region of a round jet
[SU-TF-17] N82-33664
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672
VERBAL COMMUNICATION
Aircraft alerting systems standardization study. Phase 4: Accident implications on systems design
[AD-A117876] N82-33388
VERTEBRAE
Dynamic response of vertebral elements response of the intervertebral joint to torsion
[AD-A115125] N82-34016
VERY LARGE SCALE INTEGRATION
Optimal planning and execution of DOD VLSI activities
[AD-A117238] N82-33641
VERY LONG BASE INTERFEROMETRY
Shuttle VLBI experiment. Technical working group summary report
[NASA-TM-82491] N82-34315
VERY LOW FREQUENCIES
High power transportable VLF transmitter facility
[AD-A117419] N82-33623
VHSIC (CIRCUITS)
Optimal planning and execution of DOD VLSI activities
[AD-A117238] N82-33641
An assessment of the impact of the Department of Defense very high speed integrated circuit program
[AD-A117459] N82-33646
VIBRATION
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-169419] N82-33422
The Shock and Vibration Digest, volume 13, no. 10
[AD-A106486] N82-33727
Plate vibration research, 1976-1980: Complicating effects N82-33729
Analytical and experimental investigations of bimodular composite beams
[AD-A117945] N82-33778
Effect of local vibration on divers working under water
N82-33992
The Shock and Vibration Digest, volume 13, no. 11
[AD-A108209] N82-34336
VIBRATION DAMPING
The Shock and Vibration Digest, volume 14, no. 1
[AD-A111336] N82-33561
VIBRATION EFFECTS
The Shock and Vibration Digest, volume 14, no. 1
[AD-A111336] N82-33561
VIBRATION ISOLATORS
Band saw and circular saw vibration and stability
N82-33566
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-3619] N82-33734
VIBRATION MODE
The Shock and Vibration Digest, volume 14, no. 2
[AD-A111521] N82-33564
Band saw and circular saw vibration and stability
N82-33566
VIBRATION PERCEPTION
Description/demonstration of BIODYN-80. A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limbs, head and eyes N82-34057
VINYL POLYMERS
Compressibility of colloids. 1: Compressibility studies of aqueous solutions of amphibilic polymers and their adsorbed state on Polystyrne latex dispersions by ultrasonic velocity measurements
[AD-A117416] N82-33538
VIRGIN ISLANDS
Wind energy feasibility assessment for the US Virgin Islands, siting assessment, economic study and project plan
[DE82-009476] N82-33961
VIRGO GALACTIC CLUSTER
Einstein Observatory solid state spectrometer observations of M87 and the Virgo cluster
[NASA-TM-83946] N82-34314
VISCOPLASTICITY
Nonlinear constitutive theory for turbine engine structural analysis N82-33744
VISCOSITY
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354
Preliminary study of in-situ combustion in diatomites
[DE82-013272] N82-33862
Viscosity dependence of the rates of diffusional processes
[NASA-CR-166394] N82-33982
VISCOUS DRAG
NASA research on viscous drag reduction
[NASA-TM-84518] N82-33344
VISCOUS FLOW
Acta Mechanica Sinica (selected articles)
[AD-A115634] N82-33665
Two dimensional viscous flow of a compressible fluid
[AD-A116913] N82-33667
VISIBILITY
Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary
[AD-A116794] N82-33925
Analysis of driver performance under reduced visibility
N82-34075
Cold weather goggles. Part 3: Resistance to fogging
[AD-A115898] N82-34078
Factors relating surface visibility to the total optical depth in the marine regime
[AD-A117836] N82-34232
VISION
Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system
[AD-A117141] N82-33407
Zero-crossings and spatiotemporal interpolation in vision: Aliasing and electrical coupling between sensors
[AD-A117608] N82-34019
Assessment and development of oculomotor flying skills by the application of the channel theory of vision
[AD-A115325] N82-34035
A pilot study of human factors in SAR
[AD-A117917] N82-34087
VISUAL ACUITY
Comparison of rhesus and human spectral dynamic visual acuity
[AD-A115258] N82-34018
VISUAL CONTROL
Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-34060
Application of a pilot control strategy identification technique to a joint FAA/NASA ground-based simulation of head-up displays for CTOL aircraft N82-34061
VISUAL DISCRIMINATION
Neuron selectivity: Single neuron and neuron networks
[AD-A116886] N82-34013

An EEG predictor of performance decrement in a vigilance task
[AD-A116960] N82-34014
VISUAL FLIGHT
The effect of visual information on the manual approach and landing N82-34041
VISUAL PERCEPTION
An automated optical display system for visual physiology experiments
[AD-A116499] N82-34004
Visual/motion cue mismatch during a coordinated roll manauver N82-34055
Optical flow and texture variables useful in simulating self motion
[AD-A117016] N82-34081
Category and word search: Generalizing search principles to complex processing
[AD-A115130] N82-34301
VISUAL TASKS
Combined discrete network. Continuous control modelling of operator behavior N82-34064
A model of human decision making in multiple process monitoring situations N82-34065
VOICE COMMUNICATION
Investigation into Air Launch Cruise Missile (ALCM) flight information loading and display techniques during flex targeting procedure
[AD-A115744] N82-33376
Voice Interactive Systems Technology Avionics (VISTA) Program
[AD-A117288] N82-33383
INTELSAT V-E(F-5)
[NASA-TM-84857] N82-33413
A conversational test for comparing voice systems using working two-way communication links
[AD-A116054] N82-33599
VOLCANOES
Calderas and mineralization: Volcanic geology and mineralization in the Chianti caldera complex, Trans-Pecos Texas
[DE82-013263] N82-33941
VOLCANOLOGY
A primer on sulfur for the planetary geologist
[NASA-CR-3594] N82-33459
VOLTMETERS
Voltammetric studies of a multipurpose membrane electrode N82-33455
VON KARMAN EQUATION
Solution of Von Karman's plate equation with perturbation and series summation N82-33761
VORTEX BREAKDOWN
Trailing vortices in stratified fluids
[AD-A117040] N82-33352
VORTEX SHEDDING
Vortex shedding from cylinders and the resulting unsteady forces and flow phenomenon, part 1 N82-34338
VORTICES
User's manual for interfacing a leading edge, vortex rollup program with two linear panel methods
[NASA-TM-78584] N82-33340
Euler solutions of supersonic wing-body interference at high incidence including vortex effects
[NEAR-TR-263] N82-33341
Trailing vortices in stratified fluids
[AD-A117040] N82-33352
Interaction of oscillations of channel flow and flow separation at duct discontinuities
[AD-A116801] N82-33666
Guidelines for siting WECS relative to small-scale terrain features
[DE82-009124] N82-33847
VULNERABILITY
Alternative employment concepts for Remotely Piloted Vehicle (RPV) FLIR/TV mission payload
[AD-A117877] N82-33379

W

WAFERS
Method for sequentially processing a multi-level interconnect circuit in a vacuum chamber
[NASA-CASE-MFS-15670-1] N82-33634
WAKES
Finite difference modeling of rotor flows including wake effects
[NASA-TM-84280] N82-33345
WALLS
Flow phenomena in compressor casing treatment
[CUED/A-TURBO/TR-112] N82-33661
Desorption and related phenomena relevant to fusion devices
[IPPJ-AM-22] N82-34234
Wall conditioning of the JIPP T-II Torus by ac discharge cleaning
[IPPJ-595] N82-34246
WAR GAMES
Communications processor for C3 analysis and wargaming
[AD-A115751] N82-33597
WARNING SYSTEMS
Aircraft alerting systems standardization study. Phase 4: Accident implications on systems design
[AD-A117876] N82-33388
WASTE DISPOSAL
Symposium on Environmental Technology and Management
[PB82-185273] N82-33902
Field and in-situ rock-mechanics testing manual
[DE82-015762] N82-33940
Environmental assessment model for shallow land disposal of low-level radioactive wastes
[DE82-001830] N82-34214
Three-dimensional thermal analysis for a conceptual high-level waste repository in welded tuff
[DE82-015503] N82-34217
WASTE ENERGY UTILIZATION
Advanced bio-energy systems for Air Force installations
[AD-A117084] N82-33835
Development of a waste-to-energy plan: City of Columbia, Missouri
[DE82-009288] N82-33850
WASTE TREATMENT
Electrical energy consumption and heating requirements of municipal wastewater treatment plants
[PB82-183393] N82-33882
WASTE UTILIZATION
Residual energy application program: Utilization of high-temperature waste heat by means of Rankine-cycle engines. A technical summary
[DE82-010376] N82-33839
Development of a waste-to-energy plan: City of Columbia, Missouri
[DE82-009288] N82-33850
WASTE WATER
Electrical energy consumption and heating requirements of municipal wastewater treatment plants
[PB82-183393] N82-33882
WATER
Molten phosphate electrolyte for the electrolysis of water
[DE82-008211] N82-33482
Hydrocarbon fuel chemistry: Sediment water interaction
[AD-A117928] N82-33552
Thermochemical water-splitting for hydrogen production
[PB82-208174] N82-33560
Solar- and wind-powered irrigation systems
[PB82-177486] N82-33887
Technique for the aerobic cultivation of microorganisms in water-in-oil emulsions
[NRC/CNR-TT-2031] N82-33980
The shock front rise time in water
[AD-A117426] N82-34228
WATER EROSION
Engineering geology and geomorphology of streambank erosion. Report 3: The application of waterborne geophysical techniques in fluvial environments
[AD-A115678] N82-33892
WATER FLOW
An assessment of heat-transfer correlations for turbulent water flow through a pipe at Prandtl numbers of 6.0 and 11.6
[DE82-014426] N82-33677
Irregular wave runup on smooth slopes
[AD-A113648] N82-33975
WATER HEATING
Development of an energy test method for a dedicated water-heating pump
[PB82-170069] N82-33575
Solar-heated municipal swimming pools, a case study: Dade County, Florida
[DE82-009475] N82-33844
An assessment of the field status of active solar systems
[DE82-011939] N82-33845
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859
WATER QUALITY
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813
WATER RECLAMATION
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893
WATER RESOURCES
Water resources data for Arkansas, water year 1980
[PB82-190380] N82-33818
Water resources data for Pennsylvania, water year 1980. Volume 1: Delaware River Basin
[PB82-190372] N82-33819
Water resources data for Oregon, water year 1980. Volume 2: Western Oregon
[PB82-190364] N82-33820
Water resources data for Louisiana, water year 1981. Volume 3: Coastal Louisiana
[PB82-188202] N82-33821
Coal mining and ground-water resources in the United States
[PB82-182056] N82-33903
WATER TREATMENT
Voltammetric studies of a multipurpose membrane electrode N82-33455
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893
WATER VAPOR
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-009398] N82-33842
WATER WAVES
Design and laboratory testing of a prototype linear temperature sensor
[AD-A117245] N82-33688
Observations of vertically propagating equatorially-trapped waves in the deep western Indian Ocean
[NASA-CR-169375] N82-33974
Irregular wave runup on smooth slopes
[AD-A113648] N82-33975
WAVE DIFFRACTION
Numerical results of the theory of diffraction of radio waves around the surface of the Earth (selected sections)
[AD-A115668] N82-33601
WAVE INTERACTION
An analytical solution to the problems of 3-phonon interaction and second harmonic generation in a solid plate
[AD-A117907] N82-34195
WAVE PROPAGATION
Effect of ground terrain on millimeter wave propagation
[AD-A116837] N82-33614
Studies of the propagation of elastic waves in fluids and solids
[AD-A117370] N82-33616
A survey of ionospheric models: A preliminary report on the development of an ionospheric model thesaurus and users guide
[AD-A117659] N82-33935
Observations of vertically propagating equatorially-trapped waves in the deep western Indian Ocean
[NASA-CR-169375] N82-33974
Short-pulse electron-beam propagation experiments in a controlled-environment chamber
[AD-A116999] N82-34212
Propagation characteristics in a magnetized plasma-waveguide near the ion cyclotron frequency
[IPPJ-598] N82-34253
Microwave energy coupling in a nitrogen breakdown plasma
[AD-A117900] N82-34258
WAVE RESISTANCE
High energy tail production by higher harmonic frequency up to 5 omega ci
[AD-B067129] N82-34250
WAVE SCATTERING
Effect of ground terrain on millimeter wave propagation
[AD-A116837] N82-33614
WAVEGUIDE ANTENNAS
Dielectric waveguide antenna
[AD-A117305] N82-33609
Suppression of plasma formation in waveguide antennas for lower-hybrid heating
[DE82-014392] N82-34269
WAVEGUIDE LASERS
Continuously-tunable high-repetition rate RF-excited CO2 waveguide laser
[NDRC/PUBL-82/1002] N82-33695
WAVEGUIDES
Waveguide Y-circulator
[AD-A112086] N82-33637

Waveguide gas laser
[AD-A115648] N82-33701
CO2 laser waveguiding in GaAs MBE layers
[AD-A117394] N82-33708

WAVELENGTHS
Study of laser heated propulsion devices. Part 1: Evaluation of laser devices, fuels and energy coupling mechanisms
[NASA-CR-170625] N82-33696

WEAPON SYSTEMS
Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system
[AD-A117141] N82-33407
Screening tests of conformally-coated printed wiring boards
[DE82-012873] N82-33656
Overview of the aerothermal environment of air-launched missiles
[AD-A116799] N82-33924
Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-34067
Weapon system software acquisition and support: A theory of system structure and behavior
[AD-A115555] N82-34103

WEAPONS
A program to study the detection of target hits by directed energy weapons
[AD-A117711] N82-34213

WEATHER
Testing of tritium-powered runway distance and taxiway markers
[AD-A114558] N82-33408
Separation monitoring with four types of predictors on a cockpit display of traffic information N82-34063

WEATHER FORECASTING
Marine atmospheric boundary layer and inversion forecast model
[AD-A115769] N82-33949
The role of meteorological satellites in tactical battlefield weather support
[AD-A116936] N82-33950
Forecasting heavy snow at Wenatchee, Washington
[PB82-177783] N82-33960
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981
[PB82-176967] N82-33966

WEATHER MODIFICATION
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 4: FACE-2 microphysical data for analyses of seeded and unseeded cumulus towers
[PB82-172149] N82-33964

WEATHER STATIONS
Automated Low-cost Weather Observation System (ALWOS)
[AD-A117447] N82-33954

WEATHERING
Durability of post-tensioned concrete beams exposed to severe natural weathering
[AD-A13130] N82-33769
Natural processes influencing terrain attributes. Report 1: Prediction of residual soil texture in humid temperature climates of the Federal Republic of Germany and selected analogous portions of the United States, pilot study
[AD-A116939] N82-33926

WEIGHTING FUNCTIONS
Performance bounds for binary testing with arbitrary weights
[AD-A117493] N82-34154

WELD TESTS
Comparison between shear wave ultrasonic examination and radiographic examination of some austenitic stainless steel pipe welds
[PB82-207267] N82-33584

WELDABILITY
Weld thermal simulator
[PB82-207283] N82-33583

WELDED JOINTS
GMA welding experiments using real-time control
[PB82-204652] N82-33722

WELDED STRUCTURES
Hot tensile tests of Inconel 718
[NASA-CR-162089] N82-33496

WELDING
Advanced joining technology
[AD-A117503] N82-33715
Longitudinal shrinkage of eccentric single-pass welds
[PB82-174731] N82-33720

WELLS
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893

WETLANDS
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813

WETTING
An evaluation of 3 wet dust control techniques for face drills
[PB82-177320] N82-33808

WHEAT
Evaluation of spatial filtering on the accuracy of wheat area estimate
[E82-10292] N82-33792

WHITE LIGHT HOLOGRAPHY
White light optical processing and holography
[AD-A117506] N82-33689

WIGGLER MAGNETS
Electron drift in a linear magnetic wiggler with an axial guide field
[AD-A115739] N82-33700

WILDLIFE
Terrestrial biological inventory, Hillview Drainage and Levee District, Greene and Scott Counties, Illinois
[AD-A115911] N82-33800

WIND (METEOROLOGY)
Cloud physics studies in SCPP(Sierra Cooperative Pilot Project) during 1980-1981
[PB82-174210] N82-33967

WIND EFFECTS
Nonlinear analysis of rectangular glass plates by finite difference methods
[PB82-172552] N82-33547

WIND PRESSURE
The application of US upper-wind data in one design of tethered wind energy systems
[DE82-012880] N82-33962

WIND TUNNEL APPARATUS
Design concepts and cost studies for magnetic suspension and balance systems --- wind tunnel apparatus
[NASA-CR-165917] N82-33404

WIND TUNNEL MODELS
Cryogenic wind tunnels: A selected, annotated bibliography
[NASA-TM-84474] N82-33405
Device for the control of free-spinning models in a wind tunnel
[AD-A115993] N82-33406

WIND TUNNEL TESTS
Wind-tunnel drag measurements of a ball-obturated tubular projectile
[AD-A117268] N82-33351
Numerical solution of an ill-posed problem arising in wind tunnel heat transfer data reduction
[AD-A117572] N82-33409

WIND TUNNELS
Noise measurement in wind tunnels, workshop summary
[NASA-TM-84219] N82-34188

WIND TURBINES
Theoretical and experimental power from large horizontal-axis wind turbines
[NASA-TM-82944] N82-33830
Guidelines for siting WECS relative to small-scale terrain features
[DE82-009124] N82-33847
Preliminary design and economic investigations of Diffuser Augmented Wind Tubines (DAWT)
[DE82-008475] N82-33854
Broad band sound from wind turbine generators
[NASA-CR-165810] N82-34187

WIND VELOCITY
Turbulence analysis by use of the fast Fourier transform --- for calculation of impact on missile systems
[AD-A117157] N82-33953
The application of US upper-wind data in one design of tethered wind energy systems
[DE82-012880] N82-33962

WIND VELOCITY MEASUREMENT
Analysis of a kite anemometer
[DE82-009058] N82-33691

WINDMILLS (WINDPOWERED MACHINES)
Theoretical and experimental power from large horizontal-axis wind turbines
[NASA-TM-82944] N82-33830

WINDOWS (APERTURES)
The strength of weathered window glass using surface characteristics
[PB82-172735] N82-33546

WINDPOWER UTILIZATION
Theoretical and experimental power from large horizontal-axis wind turbines
[NASA-TM-82944] N82-33830
Solar- and wind-powered irrigation systems
[PB82-177486] N82-33887
Wind energy feasibility assessment for the US Virgin Islands, siting assessment, economic study and project plan
[DE82-009476] N82-33961
The application of US upper-wind data in one design of tethered wind energy systems
[DE82-012880] N82-33962

WINDPOWERED PUMPS
Solar- and wind-powered irrigation systems
[PB82-177486] N82-33887

WING PANELS
User's manual for interfacing a leading edge, vortex rollup program with two linear panel methods
[NASA-TM-78584] N82-33340

WING ROOTS
Results of buffet tests in a cryogenic wind tunnel
[NASA-TM-84520] N82-33342

WINTER
Turbulent diffusion studies of winter storms over the Sierra Nevada Mountains
[PB82-178898] N82-33965
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981
[PB82-176967] N82-33966
Cloud physics studies in SCPP(Sierra Cooperative Pilot Project) during 1980-1981
[PB82-174210] N82-33967

WIRE
Cracking and toughness of concrete and polymer-concrete dispersed with short steel wires
[PB82-180589] N82-33578
Development of a high conductivity intercalated graphite composite wire
[DE82-008973] N82-33655

WORDS (LANGUAGE)
Category and word search: Generalizing search principles to complex processing
[AD-A115130] N82-34301

WORKLOADS (PSYCHOPHYSIOLOGY)
Subjective scaling of mental workload in a multi-task environment N82-34048

X

X RAY SOURCES
Einstein Observatory solid state spectrometer observations of M87 and the Virgo cluster
[NASA-TM-83946] N82-34314

X RAY SPECTRA
Ultraviolet and X-ray detection of the 56 Peg system (KO 2p + WD)
[NASA-CR-169351] N82-34317

X RAYS
A program to study the detection of target hits by directed energy weapons
[AD-A117711] N82-34213

Y

YAG LASERS
Laser induced polymerization reactions in solid propellant binders
[AD-A117158] N82-33548

YIELD
A scaling law of neutron yield for DT discharge in plasma focus
[IPPJ-600] N82-34254

YIELD POINT
Improved damage tolerance of titanium by adhesive lamination
[NASA-TM-84525] N82-33737

YTTRIUM-ALUMINUM GARNET
Resolution of factors responsible for difficulty in growing single crystals of YAG
[AD-A117401] N82-34279

Z

ZEOLITES
Moessbauer spectroscopic and related characterization of Fischer-Tropsch catalysts
[DE82-009280] N82-33476

ZINC
Arc-sprayed metals for structural electromagnetic shielding
[AD-A117673] N82-33629

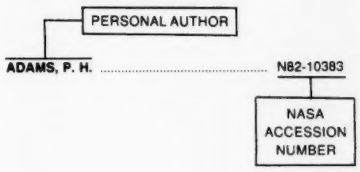
ZINC ALLOYS
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501

ZINC COMPOUNDS
Nickel-zinc batteries for RPV applications
[AD-A115843] N82-33832

Preparation and characterization of amorphous ZnAs for use in solar cells
[DE82-014516] N82-33867
ZIRCONIUM OXIDES
Zirconium oxide molds for small molybdenum investment castings
[PB82-202995] N82-33519

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

AARONS, D. N82-34003
ABBOTT, N. J. N82-33714
ABE, Y. N82-34238
ABIASSI, J. J. N82-33546
ABRAMOVICH, H. N82-33731
ABU-KHAMSIN, S. N82-33862
ACOSTA, H. M. N82-34028
ADAMS, L. N82-33752
ADAMS, M. N82-33390
ADATI, K. N82-34250
AGARWAL, G. C. N82-34038
AHMAD, J. N82-33783
AHMADIAN, M. N82-33764
AHN, H. S. N82-33726
AHRENS, J. P. N82-33975
AKAISHI, K. N82-34242
AKOYEV, I. G. N82-33993
ALBERCA, L. F. N82-33938
ALI, A. W. N82-34258
ALLAMANDOLA, L. J. N82-34320
ALLAN, B. D. N82-33548
ALLEN, J. L., JR. N82-33421
ALLEN, R. D. N82-33872
AMANO, T. N82-34249
AMEMIYA, S. N82-34239
AMIRIJAFARI, B. N82-33807
AN, C. H. N82-34327
ANDERLE, R. J. N82-33416
ANDERSON, L. W. N82-33707
ANDERSON, P. H. N82-33603
ANDERSON, R. F. N82-33927
ANDRESEN, B. N82-33841
ANNEN, K. D. N82-33869
ANSELL, G. S. N82-33434
ANSTICE, P. D. N82-33447
ANTIOCHOS, S. K. N82-34327
AOKI, T. N82-34250
ARCONE, S. A. N82-33648
ARMENTANO, T. V. N82-33896
ARMSTRONG, B. R. N82-33966
ARMSTRONG, R. L. N82-33966
ARNOLD, A. J. N82-33931
ARNOLD, S. M. N82-33685
ARNOTT, D. R. N82-34068
ARP, V. D. N82-33679
ARRIGO, R. N82-33800
ARTHUR, M. F. N82-33898
ARULANANDAN, K. N82-33581
ARZT, E. N82-33574
ASCHENBACH, J. W. N82-34085
ASHBAUGH, N. E. N82-33783
ASHBY, M. F. N82-33445
N82-33574
ASHLEY, P. R. N82-34225
ASHTON, W. B. N82-33875
ASKINS, D. R. N82-33531
ATCHISON, V. L. N82-33387
ATHANS, M. N82-34182
ATLAS, D. N82-33947
ATTENBOROUGH, K. N82-34337
AUCOIN, T. R. N82-33644
AUSLANDER, D. M. N82-34077
AYERS, O. E. N82-33548
AZRILYANT, P. A. N82-33601

B

BAAS, F. N82-34320
BABAYANTS, A. V. N82-33990
BABBITT, R. W. N82-33609
BABUSKA, I. N82-33782
BACHER, A. E. N82-33587
BACKE, K. R. N82-33647
BADAL, D. Z. N82-34097
BAGANOFF, D. N82-33919
BAGHURAMAN, P. N82-33868
BAILEY, A. D. N82-33581
BAINUM, P. M. N82-33423
BAJURA, R. A. N82-33671
BAKER, T. F. N82-33934
BALL, D. E. N82-33961
BALL, S. C. N82-33910
BALLHAUS, W. F., JR. N82-33348
BALTAKIS, F. P. N82-33415
BANDYOPADHYAY, N. N82-33497
N82-33498
BANERJEE, B. N82-33911
BANKS, B. A. N82-33521
BARACAT, W. A. N82-33687
BARNSTON, A. G. N82-33963
BARON, S. N82-34066
BARR, T. A., JR. N82-33705
BARRETT-GUELTEPE, M. A. N82-33538
BARTHOLDI, J. J., III N82-34136
BASiULIS, D. I. N82-33431
N82-33523
BASRI, G. N82-34317
BATAKIS, A. P. N82-33827
BATES, C. N82-33608
BATES, J. L. N82-34261
BATTS, G. W. N82-33417
BAUER, C. L. N82-34281
BAYHA, W. N82-33609
BAYLISS, A. N82-34191
BEAUMONT, P. W. R. N82-33445
N82-33446
N82-33447
BECK, B. D. N82-33393
BEDFORD, A. N82-34194
BEILNER, H. N82-34119
BEISSNER, R. E. N82-33502
BEJCZY, A. K. N82-34074
BELKINA, M. G. N82-33601
BELL, J. B. N82-33409
BELLUM, J. C. N82-33709
BELTON, D. N. N82-33466
BELUKHIN, A. K. N82-33992
BELYTSCHKO, T. N82-34008
BENDURA, R. J. N82-33890
BENNETT, R. D. N82-33927
BERGER, L. R. N82-33987
BERGER, M. J. N82-34023
BERGER, R. L. N82-34161
BERKOFSKY, L. N82-33955
BERKOVITS, A. N82-33492
N82-33732
BERNSTEIN, I. M. N82-34106
BERRY, G. C. N82-33542
BERRY, P. W. N82-34047
BERRY, V. L. N82-33735
BERSON, B. L. N82-33388
BERT, C. W. N82-33441
N82-33776
N82-33777
N82-33778
BESENBRUCH, G. E. N82-33560
BHATIA, J. N82-33873
BHATT, R. T. N82-33440
BINDER, M. N82-33833
BINGHAM, G. J. N82-33357
BIRD, K. L. N82-34049
BITER, W. J. N82-33842
BITTNER, A. C., JR. N82-34084
BLACK, C. D. G. N82-33811
BLAHA, G. N82-33972
BLOCK, H. W. N82-33336
N82-34162
N82-34163
N82-34164
BLOOM, H. L. N82-33404
BLOOM, K. R. N82-34018
BOBNEV, M. P. N82-33602
BOERIO, F. J. N82-33541
BOESSER, T. N82-34070
BOGATSKIY, A. P. N82-33414
BOGDANOV, R. I. N82-33933
BOLAND, A. J. N82-33723
BOLLEN, W. M. N82-34258
BOLSTER, R. N. N82-33500
BOND, D. H. N82-33835
BOOTH, F. W. N82-33979
BORGES, W. D. N82-34162
BORGES, W. S. N82-33336
BORIS, J. P. N82-33553
BORKOWSKI, R. J. N82-33857
BOROWICK, J. N82-33609
BOTSEAS, G. N82-34156
BOTTKA, N. N82-34278
BOUCHARD, E. E., JR. N82-33664
BOURNE, R. N82-33572
BOWDEN, C. M. N82-33706
BOWMAN, D. A. N82-34016
BOYD, D. M. N82-33444
BOYDEN, R. P. N82-33342
BOYER, J. E., JR. N82-34169
BOYNTON, T. A. N82-34295
BRACEY, D. R. N82-33971
BRADY, J. V. N82-34034
BRAND, R. A. N82-33432
BRAUNSTEIN, R. N82-34285
BRAY, R. S. N82-33381
BREWER, D. A. N82-33890
BRIGHAM, W. E. N82-33862
BRINKLEY, J. D. N82-33399
BRITOW, C. R. N82-33816
BROADHURST, M. G. N82-33536
BRODERICK, S. N82-33649
BROMLEY, K. N82-34219
BROOKS, G. N82-33427
BROOKS, T. L. N82-34073
BROPHY, J. J. N82-33652
BROUSSARD, J. R. N82-34047
BROWER, D. A. N82-33949
BROWN, D. R. N82-33610
BROWN, J. W. N82-34074
BROWN, K. W. N82-33391
BROWN, M. N82-33963
BROWN, R. P. N82-33936
BROWNELL, J. N82-34264
BROWNING, D. G. N82-33978
BRY, W. A. N82-33349
N82-33351
BUCH, A. N82-33492
BUCKLEY, D. H. N82-33493
BUCKLEY, W. N82-33527
BUCKNER, S. A. N82-33642
BUGLIA, J. J. N82-33918
BUISSON, J. A. N82-33364
BUONGIORNO, M. N82-33906
BURNETT, T. A. N82-33895
BURNS, T. J. N82-33786
BURR, M. J. N82-34009
BURROWS, M. N82-33709
BURSE, R. L. N82-34086
BUSH, I. J. N82-34229
BUTCHER, R. W. N82-33905
BUTCHER, T. A. N82-33477
BUTLER, J. M. N82-33531
BUXTON, L. W. N82-33451

C

CAGLAYAN, A. K. N82-34042
CALAHAN, D. A. N82-34094

CALCATERRA, F. S. N82-34132
CALVERT, E. D. N82-33519
CAMPANA, J. E. N82-33468
CAMPBELL, D. V. N82-33621
CAMPI, M. N82-33620
CANADY, J. E., JR. N82-33421
CANFIELD, R. C. N82-34330
CARADONNA, F. X. N82-33345
CARDUS, J. O. N82-33938
CAROME, E. F. N82-33616
CARPENTER, K. H. N82-34259
N82-34271
CARR, D. N82-33831
CARR, N. L. N82-33481
CARSON, J. N82-33884
CARTER, P. N82-33371
CARTER, R. C. N82-34084
CARUTHERS, J. E. N82-33669
CASE, F. N. N82-33408
CASLAVSKY, J. N82-34279
CATTO, P. J. N82-34268
CAUDILL, M. A. N82-34015
CHAGANTY, N. R. N82-34155
CHAK, J. S. N82-33581
CHAN, J. K. N82-34293
N82-34294
CHAN, Y. Y. N82-33350
CHANG, C. B. N82-34150
CHANG, C. K. N82-34335
CHANG, C. W. N82-33495
CHAO, T. S. N82-34195
CHAO, W. C. N82-33780
CHARTOFF, R. P. N82-33531
CHATURVEDI, P. K. N82-33937
CHEN, C. C. N82-33871
CHEN, D. M. N82-33871
CHEN, S. C. N82-33792
CHENG, H. S. N82-33537
CHESNUTT, J. C. N82-33499
CHEUNG, J. T. N82-34199
CHIKOS, S. F. N82-33388
CHILDS, J. M. N82-34033
CHISHOLM, M. H. N82-33503
CHIU, P. N82-33855
CHIU, T. C. W. N82-33757
CHIYODA, K. N82-34252
CHOPRA, O. K. N82-33670
CHOU, T. T. N82-34206
CHRISTIAN, F. N82-33908
CHRISTOPHER, P. M. N82-33883
CHUDOBIAK, J. M. N82-33761
CHUNG, Y. M. N82-33726
CHUNG, Y. W. N82-33509
CLARK, C. R. N82-33901
CLARK, L. N. N82-33597
CLAYDON, M. F. N82-33908
CLEMENT, W. F. N82-34043
CLIFTON, K. S. N82-33411
COFFEY, H. E. N82-34331
N82-34332
N82-34333
COGAN, D. L. N82-33657
COCHLAN, W. A. N82-33512
COHEN, H. N82-34027
COLE, W. E. N82-33577
COLINET, J. F. N82-33812
COLTON, D. N82-34193
CONRARD, M. N82-34025
CONVERTINO, V. A. N82-33999
COOK, C. W. N82-33630
COOK, G. M. N82-33486
COOKE, W. N. N82-34036
COOPER, L. N. N82-34013
COPPENS, A. B. N82-34192
CORDLE, V. M. N82-34300
CORNELY, R. H. N82-33572
CORSON, W. D. N82-33958
COTE, S. M. N82-33337
COTTONE, L. C. N82-33554
COTTRELL, P. N82-33482
COVINGTON, D. W. N82-34282
CRAIG, R. D. N82-33534
CRAIG, S. J. N82-34043
CRAM, C. W. N82-33368
CRANDALL, R. E. N82-34088
CRANE, R. K. N82-33592
CRAWFORD, G. B. N82-34135
CREMER, G. N82-33863
CRETCHER, C. K. N82-33658
CROCKETT, T. W. N82-33752
CROMBIE, M. A. N82-33687
N82-33799
CRONIN, P. G. N82-33870
CRONKHITE, J. D. N82-33735
CROOKS, W. H. N82-34029
N82-34030
CROTEAU, J. R. N82-33580
CROWLEY, T. J. N82-33946
CUDDIHY, R. G. N82-33900
N82-33901
CUMMINGS, R. J. N82-33359
CUMPSTY, N. A. N82-33661
CUTCHINS, M. A. N82-33758
CUTOLO, G. F. N82-34025
CZEKAJSKI, C. N82-33747

D

DAGENHART, W. K. N82-34211
DAILEY, C. L. N82-33424
N82-33425
DALLAM, W. C. N82-34107
DALLI, R. N82-33789
DANDL, R. A. N82-34271
DANIELS, J. D. N82-34004
DAPPERT, D. N82-33832
DARYANIAN, B. N82-34048
DAS, D. N82-33495
DASILVA, M. K. N82-34259
DAVENPORT, E. L. N82-34046
DAVID, S. A. N82-33515
DAVIS, G. T. N82-33536
DAVIS, H. T. N82-34145
DAVIS, R. E. N82-33587
DAVLIN, J. J. N82-34109
DAVYDOV, V. P. N82-33990
DAWICKE, D. S. N82-33738
DAY, D. J. N82-33840
DAZEY, M. H. N82-33623
DAZZO, J. J. N82-34052
DE, S. N82-33563
DECKERT, W. R. N82-33334
DEFILIPPI, R. P. N82-33893
DEFUR, P. O. N82-33552
DEHMER, J. L. N82-34198
DEJESUSPARADA, N. N82-33792
N82-33793
DELAHAY, P. N82-34202
DELANEY, A. J. N82-33648
DELIMA, A. M. N82-33792
DEMAREE, J. N82-33360
DENGLER, A. T., JR. N82-33968
DENNIS, J. B. N82-34098
DERBALIAN, G. N82-33427
DEREGGI, A. S. N82-33536
DEROSSI, D. N82-33536
DESILVA, B. M. E. N82-33340
DESOPPER, A. N82-33345
DESTLER, W. W. N82-33625
DEUTERMANN, A. R. N82-33684
DEVANEY, J. J. N82-34210
DIARRA, C. M. N82-33423
DICKEY, H. C. N82-33842
DICKINSON, J. T. N82-33535
DIEBOLD, J. P. N82-33478
DINWOODIE, T. L. N82-33866
DODSWORTH, V. A. N82-34025
DOERR, R. N82-33716
DOHERTY, T. J. N82-33872
DOMBROSKI, R. N82-33539
DONOVAN, J. C. N82-33984
DORMOND-HERRERA, R. N82-33455
DORNBUSCH, W. K., JR. N82-33926
DORSETT, D. N82-34167
DOSIK, M. M. N82-34288
DOTY, K. N82-33385
DOUGLASS, L. N., JR. N82-34085
DOW, T. A. N82-33719
DREHER, D. E. N82-34010
DRESCHER, P. N82-33663
DUBE, C. M. N82-33688
DUEX, T. W. N82-33941
DUNN, K. P. N82-34150
DUNN, W. P. N82-33571
DUNSMORE, H. E. N82-34108
DURSO, F. T. N82-34028
DURSO, S. S. N82-34218
DUSTIN, M. O. N82-33829
DUTHIE, J. G. N82-34225
DVORAK, G. J. N82-33443
DYE, R. N82-33795

E

EASTERLING, K. N82-33574
EATON, R. R. N82-34217
EBERSOLE, B. A. N82-33951
EBINGER, J. N82-33800
EBRAHIMIAN, B. N82-34293
EDGE, R. J. N82-33934
EDGINGTON, P. N82-34025
EDMONDS, J. D. N82-33367
EDWARDS, D. H. N82-33553
EFFA, P. K. N82-33823
N82-33836
EGARDT, B. N82-33600
EHRICH, R. W. N82-34096
EINAGA, Y. N82-33542
EINDHORN, H. J. N82-34026
EISELE, F. L. N82-34282
ELCHERIF, Y. S. N82-33645
ELIAS, L. R. N82-33702
ELLINS, V. N82-33603
ELLIS, S. N82-33983
EMERSON, C. J. N82-34214
EMSLIE, A. G. N82-34327
EMURIAN, H. H. N82-34034
ENDERS, J. H. N82-33366
ENGELKENS, E. J. N82-34010
ENGEN, I. A. N82-33856
ENGLER, H. F. N82-34046
ENKE, C. G. N82-33470
N82-33471
N82-34200
ENOCHIAN, R. V. N82-33887
ENTZMINGER, T. A. N82-33910
ERLANDSON, R. E. N82-33714
ERNST, R. N82-33428
ESSENWANGER, O. M. N82-33953
ETHRIDGE, J. D. N82-33717
ETHRIDGE, N. H. N82-34148
EUBANK, R. L. N82-34168
N82-34172
EVANS, A. R. N82-33811
EVANS, W. J. N82-34006
EVANS, W. K. N82-33379
EVEN, W. R. N82-33656
EVERETT, S. S. N82-33599
EVERSON, M. L. N82-34087
EWING, J. M. N82-34231
EWING, K. J. N82-34273
EYRES, A. R. N82-33908

F

FACEMIRE, B. R. N82-33683
FAIRALL, C. W. N82-34232
FAIRFULL, G. S. N82-33840
FAIRMAN, T. M. N82-34002
FALB, P. L. N82-34133
FALCON, G. D. N82-33633
FALVEY, S. R. N82-33364
FARMER, M. G. N82-33736
FARRAND, R. L. N82-33985
FASANELLA, E. L. N82-33733
FASCHING, W. A. N82-33393
FASSIHI, M. R. N82-33862
FELDMAN, M. B. N82-34304
FERMELIA, A. J. N82-34129
N82-34130
N82-34131
FERRELL, W. R. N82-34054
FERTIS, J. N82-33390
FEVES, M. L. N82-33940
FIELDS, D. E. N82-34214
FINNERTY, A. A. N82-33567
FISCHER, P. N82-33608
FISHER, P. D. N82-33471
FISHER, R. N82-34334
FISK, A. D. N82-34301
FITZPATRICK, G. L. N82-33723
FLAHERTY, J. E. N82-34141
FLEISCHMANN, S. T. N82-34338
FLUSBERG, A. N82-34201
FLYNN, G. W. N82-33618
FODOR, G. E. N82-33550
FOLEY, J. D. N82-34304
FOMENKO, B. S. N82-33993
FONG, F. N82-34076
FONSECA, G. F. N82-34021
FOOTE, R. N82-33378
FOREMAN, K. M. N82-33854
FORESTI, C. N82-33793
FORREST, R. D. N82-33398
FOSSUM, A. F. N82-33872
FOSTER, K. M. N82-33940
FRAME, E. A. N82-33526
FRANCESCONI, R. P. N82-34017
FRANK, A. H. N82-33364
FRANK, K. H. N82-33788
FRANKLIN, M. L. N82-33475
FREEMAN-LYNDE, R. P. N82-33916
FRIEDMAN, M. H. N82-33468
FRIEND, N. N82-33799
FROHNE, H. C. N82-33905
N82-34025

FROST, R. T. N82-33495
FROST, W. N82-33691
N82-33847
FUCHS, W. N82-33692
FUJITA, J. N82-34239
FULLER, A. T. N82-34160
FUNKHOUSER, E. A. N82-34076
FURNO, A. L. N82-33810
FURUKAWA, R. N82-33542
FYLER, D. C. N82-34111

G

GABBAY, S. N82-33622
GABEL, R. A. N82-33984
GABRIEL, W. F. N82-33607
GALDON, E. N82-33938
GALLAGER, R. G. N82-34151
GALLAGHER, J. P. N82-33738
GAMMELL, P. M. N82-33996
GANGULI, G. N82-34183
GARCIA, C. N82-34334
GARNER, H. R. N82-34263
GASKILL, G. P. N82-34025
GATES, D. H. N82-33840
GAY, D. N82-33747
GAY, H. N82-33686
GEBALLE, T. R. N82-34320
GEDWILL, M. A. N82-33522
GEHL, S. M. N82-33487
GELINAS, R. J. N82-34142
GERDES, R. M. N82-33398
N82-34060
GERGAUD, M. N82-33905
GERSTL, S. A. W. N82-33899
GEVORKOVA, T. A. N82-33529
GEZARI, D. Y. N82-34319
GIBBARD, H. F. N82-33871
GIBSON, J. S. N82-33594
GIGNAC, D. A. N82-33782
GILBERT, E. G. N82-33402
GILL, P. E. N82-34114
GILLELAND, J. R. N82-34267
GILMAN, S. N82-33833
GIORDANO, F. R. N82-34137
GLAGLEV, Y. A. N82-33933
GLASGOW, T. K. N82-33522
GLASSMAN, M. N82-34300
GLENDE, J. H. N82-34088
GODTHELP, H. N82-34071
GOFF, F. N82-33863
GOGLIA, G. L. N82-33422
GOLDMAN, M. V. N82-34257
GOLDMAN, R. F. N82-34083
GOLDSMITH, i. M. N82-33375
GOLDSTEIN, M. L. N82-34325
GOLSMITH, T. E. N82-34028
GOMAY, Y. N82-34241
GOOD, D. L. N82-34087
GOOD, M. S. N82-33505
GOODMAN, J. M. N82-33935
GOODMAN, R. K. N82-34272
GOODRICK, T. F. N82-33356
GORDANINEJAD, F. N82-33777
GORDON, G. L. N82-33967
GORDON, J. R. N82-33905
GOROKHOV, Y. S. N82-33639
GOTTLIEB, G. L. N82-34038
GOULD, P. L. N82-33756
GOVINDARAJ, T. N82-34068
GOVINDARAJU, K. N82-33667
GRAHAM, S. A. N82-33862
GRAMS, G. W. N82-34323
GRAY, H. L. N82-34144
N82-34171
GREELEY, R. N82-33789
GREEN, H. N82-33382
GREEN, J. N82-34046
GREENE, E. N82-33716
GREENSPAN, M. A. N82-34212
GREENSTEIN, J. S. N82-34065
GREENWALD, R. A. N82-33613
GREMBAN, K. D. N82-34129
N82-34130
N82-34131
GRESSMANN, R. N82-33514
GRIERSON, D. E. N82-33757
GRIFFITH, J. R. N82-34224
GRIFFITH, W. C. N82-33901
GRIFFITHS, S. K. N82-33939
GRIGGS, M. N82-33945
GRILLO, D. N82-34119
GROMAN, R. C. N82-34095
GROSSER, Z. A. N82-33454
GROSSET, A. M. N82-33545
GROSVELD, F. W. N82-34187
GROVE, H. M. N82-34339
GRUBIN, H. L. N82-34277
GUEDRY, F. E., JR. N82-34011
GUELFO, G. N82-33908
GUELTEPE, M. E. N82-33538
GUNST, R. F. N82-34167
GUOCAN, L. N82-33665
GUPTA, S. S. N82-34165
GURNETT, D. A. N82-34326
GURWELL, W. E. N82-33875
GUZMAN, A. N82-34281

H

HACKERMAN, L. B. N82-33415
HACKNEY, E. H. N82-34222
HAEMMERLI, A. M. N82-33652
HAFF, K. W. N82-33408
HAGER, D. G. N82-33893
HAIG, T. O. N82-33950
HAINES, P. A. N82-33802
HALE, C. N82-34067
HALE, J. K. N82-34152
HALEY, D. C. N82-34129
N82-34130
N82-34131
HALL, R. E. N82-34302
HALLETT, J. N82-33964
HALPERT, G. N82-33824
HAMBLEM, D. G. N82-33485
HAMMOND, K. A. G. N82-33907
HAMOUDA, M. N. H. N82-33734
HAN, K. J. N82-33756
HANCE, R. L. N82-33466
HANE, G. J. N82-33875
HANRATTY, J. M. N82-33606
HANSON, D. C. N82-33388
HANSON, J. P. N82-34216
HANWAY, J. E., JR. N82-33487
HARDEE, J. E. N82-33763
HARJU, M. N82-33722
HARLEY, S. F. N82-34093
HARRINGTON, W. W. N82-33363
HARRIS, J. E. N82-33575
HARRIS, P. N82-34228
HARRISON, E. S. N82-33432
HARRISON, R. L. N82-33381
HARRISON, W. L. N82-33957
HART-SMITH, L. J. N82-33713
HART, S. N82-34049
HARTLEY, J. N82-33608
HARTMAN, G. A. N82-33738
HASEGAWA, M. N82-34237
HASHA, D. L. N82-33450
HASHIBA, H. N82-34239
HASHIMOTO, K. N82-34325
HATTORI, K. N82-34250
HATVANY, J. N82-33573
HAUSER, S. G. N82-33875
HAVAHERI, S. N82-33984
HAYASHI, Y. N82-33624
HAYDUK, R. J. N82-33765
HAYES, P. D. N82-34012
HEATON, E. N82-33831
HEAVEY, K. R. N82-33353
HEFFLEY, R. K. N82-34043
HEIKEN, G. N82-33863
HEISER, D. P. N82-33489
N82-33491
HEITMEYER, C. L. N82-33598
HELFAND, D. N82-34317
HELMAN, D. D. N82-33520
HEMINGWAY, J. C. N82-33381
HENDERSON, H. R. N82-34186
HENDERSON, T. L. N82-33605
HENNIGAR, H. F. N82-33796
HENRY, C. D. N82-33941
HENRY, R. F. N82-33487
HERR, K. C. N82-34218
HERREN, K. A. N82-33611
HERTZBERG, M. N82-33810
HERTZEL, R. J. N82-33635
HICKLEY, D. H. N82-34188
HIDEKUMA, S. N82-34250
HIGGINS, B. N82-33831
HILDEBRAND, B. P. N82-33723
HILL, F. J. N82-34113
HILLIER, J. A. N82-33811
HILTON, A. R. N82-34286
HINDSON, W. S. N82-33400
HIRAI, I. N82-33754
HIROE, S. N82-34250
HIROMOTO, G. N82-34214
HIROYUKI, Y. N82-33573
HITE, J. E., JR. N82-33717
HIXSON, W. C. N82-34011
HOBBS, C. H. N82-33900
HOBBS, P. V. N82-33956
HODGSON, T. J. N82-34292
HOFER, O. C. N82-33696
HOFFMAN, J. W. N82-34015
HOFMANN, D. J. N82-33920
HOGARTH, R. M. N82-34026
HOLAH, G. D. N82-34282
HOLCOMB, J. W. N82-33960
HOLLER, E. M. N82-33407
HOLLISTER, W. M. N82-34062
HOLMES, C. W. N82-34033
HOLMES, J. C. N82-33923
HOLST, T. L. N82-33346
HOLT, J. W. N82-33520
HOLT, S. S. N82-34314
HOLT, W. H. N82-33435
HOLTZ, D. R. N82-33554
HOLTZMAN, G. L. N82-34011
HOPP, W. J. N82-33875
HORD, D. J. N82-34014
HOROWITZ, S. M. N82-33369
HORSLEY, R. N82-34289
HORTON, R. M. N82-33507
HOUSER, A. O. N82-33883
HOUSNER, J. M. N82-33739
HOVER, G. L. N82-34230
HOWARD, W. G. N82-33379
HOWISON, W. W. N82-33388
HSU, S. Y. N82-33798
HUANG, K. H. N82-33691
HUBA, J. D. N82-33922
HUBBARD, H. H. N82-34187
HUBBARD, R. W. N82-34017
HUBBARTT, J. E. N82-33666
HUFF, W. J. N82-33835
HUFFMAN, W. N82-33954
HUGUS, D. K. N82-34138
HULBURT, E. O. N82-33935
HUNDLEY, R. N82-34092
HUNT, A. J. N82-33838
HUNT, B. R. N82-34233
HUNZELMAN, F. W. N82-34012
HURFORD, G. J. N82-34329
HUSTON, R. L. N82-33762
HWA, R. C. N82-34205
HYATT, T. D. N82-33853
HYMAN, H. A. N82-34201
HYMAN, J. M. N82-34157
HYNES, T. V. N82-34227

I

IAFRATE, G. J. N82-34280
ICHIKAWA, Y. H. N82-34244
N82-34248
N82-34251
ICHIMURA, M. N82-34250
IINO, K. H. N82-34244
N82-34248
N82-34251
IKUTA, K. N82-34243
N82-34254
IMBEMBO, S. N82-33954
INGELS, F. M. N82-34322
INGRAHAM, D. F. N82-33450
INMAN, D. J. N82-33764
ISHIBE, Y. N82-34246
ISHJI, S. N82-34246
ISLAM, M. N82-33751
IVANOVA, N. P. N82-33994
IVANOVA, V. S. N82-33433
IWAI, T. N82-34236
IYER, L. S. N82-33579

J

JACKSON, L. C. N82-33711
JAGO, S. N82-34063
JANATA, J. N82-33652
JANETZKE, D. C. N82-33830
JEFFRIES, G. N82-33934
JEFFRIES, R. A. N82-33500
JENKINSON, H. A. N82-33708
JENNINGS, A. N. N82-33570
JENSEN, R. N. N82-33825
N82-33826
JETER, J. W., JR. N82-33775
JEWELL, W. F. N82-34061
JEX, H. R. N82-34057
JOCIC, L. B. N82-33658
JOHNSON, B. E. N82-34231

JOHNSON, D. A. N82-33463
JOHNSON, I. N82-33670
JOHNSON, J. L. N82-33611
JOHNSON, J. W. N82-34302
JOHNSON, L. T. N82-33591
JOHNSON, S. K. N82-33352
JOHNSON, W. G., JR. N82-33342
JOHNSON, W. S. N82-33737
JOHNSTON, P. N82-33427
JOLSON, J. D. N82-33449
JONES, C. P. N82-33591
JONES, N. N82-33728
JONES, R. E. N82-34116
JONES, R. M. N82-33631
JONES, S. N82-33378
JONES, W. B., JR. N82-33781
JORDAN, J. N82-33964
JORDAN, T. H. N82-33932
JOSHI, S. M. N82-33422
JOUANY, J. M. N82-33464
JOUNG, I. N82-34192
JUVA, A. N82-33584

K

KAELIN, G. R. N82-34091
KAEPPLER, W. D. N82-34075
KAHANER, D. K. N82-34116
KAILATH, T. N82-33600
KALDUZOV, G. P. N82-33933
KAMARATOS, E. N82-34335
KAMAT, M. P. N82-33741
KAMMAN, J. W. N82-33762
KAMMLER, D. W. N82-34143
KANAKIA, M. D. N82-33550
KANEKO, S. N82-34252
KANG, S. C. N82-33726
KANNEL, J. W. N82-33719
KAPLAN, J. D. N82-34029
N82-34030
KARACOSTAS, T. S. N82-33965
KARCANIAS, N. N82-34159
KARI, A. N82-33787
KATO, M. N82-33506
KATZ, I. N. N82-33749
KAWAHATA, K. N82-34239
N82-34241
N82-34246
KAWAMOTO, T. N82-34250
KAWAMURA, T. N82-34238
N82-34242
KAWASUMI, Y. N82-34246
KAWATA, S. N82-34255
KEAL, B. E. N82-33908
KEARNS, J. H. N82-34080
KEDL, R. J. N82-33857
KEER, L. M. N82-33537
KEGLEY, L. N82-33923
KEITER, I. D. N82-33347
KELLER, R. W. N82-34298
KELLY, D. G. N82-34140
KELLY, V. E. N82-33650
KELSO, A. R. N82-33925
KENNERLEY, J. B. N82-33815
KERAMIDAS, G. A. N82-34147
KERSHNER, A. D. N82-33921
KESKINEN, M. J. N82-33922
KHANUKAYEV, Y. A. N82-33990
KIELE, C. F., JR. N82-33940
KILGORE, R. A. N82-33405
KIM, J. N82-34211
KIM, J. S. N82-34161
KIMEL, I. N82-34204
KING, J. M. N82-33681
KING, M. J. N82-33784
KINSELLA, M. A. N82-33532
KIRK, T. N82-34209
KLEIN, J. P. N82-33906
KLEIN, R. W. N82-34062
KLEINAN, D. L. N82-34058
KLEINSTEIN, B. N82-34024
KLER, T. J. N82-33784
KLET, L. E. N82-34088
KLICH, D. J. N82-34139
KLING, C. W. N82-33772
KLINGER, L. N82-34224
KLOPFER, G. H. N82-33341
KNOTT, J. D. N82-33752
KNOWLTON, S. F. N82-34269
KO, T. N82-33374
KOBATA, T. N82-34254
KOBZEV, A. A. N82-33639
KOCH, R. A. N82-33970
KOHL, K. B. N82-33526
KOLACZKOWSKI, S. T. N82-33906
KOLPIKOV, Y. G. N82-33990
KOMA, A. N82-34234
KONG, J. A. N82-33614
KONRAD, W. L. N82-33978
KOONS, H. C. N82-33623
KOPALA, A. J. N82-34085
KOPPE, R. H. N82-34298
KORN, A. E. N82-33374
KORN, J. N82-34058
KORNOSKY, R. M. N82-33692
KORSHUNOV, V. M. N82-33994
KOSKY, P. G. N82-33480
KOST, J. A. N82-33812
KOTTER, J. N82-33539
KOVACS, A. N82-33801
KRAMER, I. R. N82-33774
KRAVCHENKO, L. V. N82-33989
KRECHMER, M. V. N82-33933
KRIKORIAN, O. H. N82-33482
KRIKSUNOV, L. Z. N82-34221
KRISHNA, C. R. N82-33477
KRISTIANSEN, M. N82-33640
KRIVITSKIY, B. K. N82-33602
KROLL, Q. D. N82-33594
KRYDER, M. H. N82-34281
KRYUKOV, A. S. N82-33406
KUBB, R. N82-33800
KUCHTA, J. M. N82-33810
KUHLMAN, M. R. N82-33897
KUHN, G. D. N82-33341
KULKARNI, S. V. N82-33444
KUMAR, K. N82-33495
KUMAR, V. K. N82-33423
KUMAZAWA, R. N82-34250
KURTH, W. S. N82-34326
KUSENKOV, A. F. N82-33933
KUTZ, I. N82-34015
KUZMICHEVA, V. I. N82-33933
KUZMINA, L. M. N82-33461
KUZNETSOV, F. S. N82-33414

L

LACY, J. H. N82-34320
LACY, L. L. N82-33683
LAFFERTY, J. F. N82-34016
LAFFERTY, R. R. N82-34303
LAHIRI, S. N82-33884
LAI, T. H. N82-34090
LAKHOV, F. P. N82-33992
LAL, K. M. N82-33745
LAM, N. N82-33804
LAM, P. N82-33390
LAMB, W. E., JR. N82-34208
LAMBETH, B. S. N82-33358
LAMBRECHT, M. N82-34292
LAMBY, E. J. N82-33480
LANCRAFT, R. N82-34066
LANDSHOFF, R. N82-34264
LANE, K. R. N82-33590
LANSING, N. N82-33864
LAROZE, S. N82-33747
LATEGOLA, M. T. N82-34009
LATVEN, R. K. N82-33470
N82-34200
LAU, A. S. N82-33853
LAUBER, J. K. N82-33381
LAWRENCE, V. S. N82-33633
LAYTON, G. E. N82-33677
LAZAREVA, T. Y. N82-33529
LEA, J. N82-33587
LEA, S. M. N82-34314
LEACH, J. N82-34328
LEACH, K. N82-33394
LEAVENWORTH, H. W., JR. N82-33519
LEBACQZ, J. V. N82-33398
LEBERL, F. W. N82-33803
LECREN, R. T. N82-33827
LEE, C. C. N82-33542
LEE, C. Y. C. N82-33781
LEE, D. N82-34156
LEE, E. H. N82-33779
LEE, H. D. N82-33524
LEE, J. N82-34104
LEE, R. R. N82-33967
LEE, S. W. N82-33753
LEE, X. S. N82-34268
LEE, Y. P. N82-33726
LEFFERTS, R. E. N82-33370
N82-33619
LEIBOVICH, S. N82-33894
LEISSA, A. N82-33729
N82-33760
LEISTER, H. J. N82-33365
LEITH, D. E. N82-33984
LEITH, E. N82-33689
LEMOINE, A. N82-33385
LENC, J. F. N82-33670
LENGE, H. N82-33908
LENTZ, J. M. N82-34011
LETTVIN, J. D. N82-34118
LEVIN, M. N82-33844
LEVINE, L. N82-34006
LEVINE, S. R. N82-33522
LEVINTON, F. M. N82-34270
LEVISON, W. H. N82-34042
N82-34050
LEVY, A. H. N82-33881
LEVY, B. C. N82-33770
LEWANDOWSKI, G. A. N82-33397
LEWIS, J. L. N82-34074
LEWIS, R. C. N82-33615
LEWYCKYJ, J. Z. N82-34082
LI, C. H. N82-33840
LIEBERT, B. E. N82-33987
LIGHT, M. N82-34087
LIMEBEER, D. N. J. N82-34159
LIN, C. C. N82-33707
LIN, H. N82-33718
LIN, P. M. N82-33645
LINDSAY, T. A. N82-34231
LING, S. C. N82-34284
LINSKY, J. L. N82-34317
N82-34318
LISTER, M. J. N82-33364
LITTLE, C. A. N82-34214
LITTON, C. D. N82-33810
LIU, C. H. N82-34189
LIU, H. K. N82-34225
LIU, N. S. N82-34277
LLOYD, L. B. N82-33448
LO, C. C. N82-33476
LO, Y. T. N82-33612
LOAR, G. R. N82-33890
LOEPPKY, J. A. N82-34007
LOEWY, R. G. N82-33434
LOFTY, G. J. N82-33811
LOH, Y. C. N82-33594
LOMBARDO, M. A. N82-33793
LOPEZ, J. N82-33528
LORENZ, J. J. N82-33677
LOUCKS, O. L. N82-33896
LOUHENPERA, R. N82-33721
LOVBERG, R. H. N82-33424
N82-33425
LOVELAND, D. W. N82-34154
LOVELY, R. H. N82-33986
LOVOLD, S. N82-33695
LOWINGER, T. N82-34000
LOWRIE, J. W. N82-34129
N82-34130
N82-34131
LU, P. N82-34105
LUCAS, W. H. N82-33399
LUCKHARDT, S. C. N82-34269
LUMLEY, J. L. N82-33894
LUNAK, S. N82-33465
LUNDSTROM, D. L. N82-33986
LURIA, S. M. N82-34078
LUSKIN, M. N82-33678
LUTZ, S. A. N82-33671
LUTZE, F. H. N82-33338
N82-33339
LYLE, F. F., JR. N82-33508
LYNE, P. J. N82-34009
LYON, B. N82-33716

M

MA, J. A. N82-33766
MACARTHUR, C. D. N82-33361
N82-33802
MACINTYRE, W. G. N82-33552
MADDALON, D. V. N82-33344
MAEKAWA, T. N82-34249
MAESTRELLO, L. N82-34191
MAGDALENO, R. E. N82-34057
MAGER, M. N82-34017
MAHONEY, P. C. N82-33868
MAKO, F. N82-33700
MALIK, R. J. N82-33644
MALLETT, R. L. N82-33779
MALTSEV, V. N. N82-33994
MANDELL, J. F. N82-33524
MANOLIS, G. D. N82-33755
MANSFIELD, G. H. N82-33906
MANWELL, A. R. N82-33343
MARCHANT, D. D. N82-34261
MARCHIONDA, K. M. N82-33387
MARGERUM, E. A. N82-33928

MARK, C. M. N82-34302
MARMIN, A. N82-33906
MARNELL, P. N82-33477
MARTIN, R. D. N82-34219
MARTIN, W. W. N82-33976
MARTZ, J. E. N82-33828
MARWITZ, J. D. N82-33967
MASSO, J. F. N82-33932
MATHESON, R. J. N82-33633
MATSUMOTO, A. N82-34236
MATTHEWS, R. S. N82-33471
MATVEEVA, F. A. N82-34288
MATZEN, V. C. N82-33763
MAXFIELD, B. W. N82-33444
MAXWELL, J. D. N82-33895
MAXWELL, K. N82-34028
MAY, J. R. N82-33892
MAY, R. G., JR. N82-34226
MAYLOTTE, D. H. N82-33480
MAZOUR, T. J. N82-34230
MCBRIEN, E. F. N82-33636
MCCLEAVE, W. S. N82-33785
MCCLELLAN, R. O. N82-33901
MCCOOL, S. C. N82-34262
MCENTIRE, P. N82-33385
MCFARLAND, M. B. N82-34200
MCGARRY, F. J. N82-33524
MCGHEE, K. H. N82-33588
MCGUCKIN, J. N82-33490
MCGUFFIN, M. W. N82-34271
MCKEE, D. W. N82-33480
MCKNIGHT, A. L. N82-34126
MCKNIGHT, W. B. N82-33705
MCLAUGHLIN, D. K. N82-34189
MCLAUGHLIN, E. J. N82-34115
MCLEAN, J. D. N82-33598
MCLELLAN, J. C. N82-33586
MCMAHON, C. J., JR. N82-33497
N82-33498
MCNEILL, W. E. N82-34060
MCRAE, C. M. N82-33581
MCTIERNAN, J. M. N82-34197
MEAD, J. M. N82-34319
MEAGHER, D. N82-34112
MEDAN, R. T. N82-33340
MEEKS, E. L. N82-34282
MEGER, R. A. N82-33638
MEIER, G. H. N82-33504
MEISSINGER, H. F. N82-33424
N82-33425
MEKHRYAKOV, V. I. N82-34221
MELLEN, R. H. N82-33976
MELOSH, R. J. N82-33751
MELVIN, W. S. N82-33548
MENEGHINI, R. N82-33947
MERCER, B. D. N82-34103
MERKULOV, A. G. N82-34288
MERRIMAN, T. L. N82-33719
METZGER, S. W. N82-33856
MEYER, L. N82-33672
MEYERHOFF, J. L. N82-34034
MEYERS, J. E. N82-33392
MIDZUNO, Y. N82-34235
MIKHAYLOV, M. M. N82-33406
MILLER, A. K. N82-33511
MILLER, C. G. N82-33567
MILLER, D. N82-33531
MILLER, E. N82-33549
MILLER, G. E. N82-34053
N82-34231
MILLER, M. C. N62-33354
MILLER, R. A. N82-34064
MILLER, R. H. N82-34127
N82-34128
MILLER, S. A. N82-33487
MILLS, W. J. N82-33517
MINSKY, M. L. N82-34127
N82-34128
MINSTER, J. B. N82-33932
MIRANDA, H. A., JR. N82-34220
MIRTICH, M. J. N82-33521
MITCHELL, J. G. N82-33908
MITCHELL, M. R. N82-33499
MITCHELL, R. W., III N82-33915
MITTER, S. K. N82-34182
MITTRA, R. N82-33624
MIYAHARA, A. N82-34242
MIYAKE, S. N82-34237
MOCK, W., JR. N82-33435
MOELLERING, H. N82-33804
MOHR, R. L. N82-34040
MOHRI, A. N82-34237
MOHRI, M. N82-34239
MOLUSIS, J. A. N82-33373
MOLYNEUX, M. K. B. N82-33908
MONASH, C. A. N82-34177
MONTOYA, A. P. N82-33556
MOORE, A. C. N82-34302
MOORE, J. P. N82-33908
MOORE, R. D. N82-33389
MOOSE, R. L. N82-33399
MORAN, D. D. N82-33570
MORE, J. J. N82-34134
MOREIRA, M. A. N82-33792
MORGAN, R. L. N82-33611
MORGAN, S. H. N82-34315
MORI, T. N82-34101
MORRISON, C. A. N82-34283
MORSE, J. W. N82-33475
MORTON, M. J. N82-34144
N82-34171
MOSKAL, E. P. N82-33773
MOTE, C. D., JR. N82-33566
MOUGEY, E. H. N82-34034
MOUNTAIN, J. K. N82-34158
MOUSA, J. J. N82-34302
MUDHOLKAR, G. S. N82-34166
MUELLER, R. K. N82-33771
MUESING, W. E. N82-33501
MULAY, L. N. N82-33476
MULLEN, R. L. N82-33750
MUNCHMEYER, F. C. N82-33987
MUNRO, P. N82-34013
MURAIDHARAN, R. N82-34066
MURAKAMI, A. N82-34235
MURAKAMI, H. N82-34255
MURFREE, J. A. N82-33548
MURPHY, A. J. N82-33870
MURPHY, W. J. N82-33921
MURRAY, W. N82-34114
MUSHINSKI, D. N82-33492
MUSHOTZKY, R. F. N82-34314
MYERS, L. E. N82-33930
MYERS, T. R. N82-34004
MYLES, K. M. N82-33670

N

NAEGELI, D. W. N82-33550
NAGLE-ESHLEMAN, J. N82-33561
N82-33564
N82-33727
N82-34336
NARIHARA, K. N82-34237
N82-34247
NASH, L. N82-34087
N82-34230
NAVRATIL, G. A. N82-34270
NAYGOVZIN, O. I. N82-34221
NECZAJ-HRUZEWICZ, J. N82-33462
NELSON, E. P. N82-33917
NERI, D. F. N82-34078
NESMITH, B. C. W. N82-33694
NEVILLE, C. A. N82-33913
NEWMAN, F. C. N82-33969
NEWTON, H. J. N82-34145
N82-34176
NEWTON, K. R. N82-33457
NEWTON, R. J. N82-33870
NG, C. A. N82-33791
NG, W. C. N82-33458
NICHOLSON, W. F. N82-33979
NIELSEN, C. M. N82-33688
NIELSEN, J. N. N82-33341
NIELSEN, K. R. K. N82-34019
NIELSEN, P. N82-33629
NIERO, M. N82-33793
NIETUBICZ, C. J. N82-33353
N82-33355
NILSEN, D. N. N82-33518
NILSON, R. H. N82-33939
NINZ, N. R. N82-34045
NISHIHARA, H. K. N82-34019
NISHIOKA, G. M. N82-33683
NIU, K. N82-34255
NODA, N. N82-34239
N82-34241
N82-34246
NOONAN, K. W. N82-33372
NOOR, A. K. N82-33739
NORMAN, H. J. N82-33560
NOVAK, K. M. N82-34022
NOVOSELOV, B. V. N82-33639
NUNN, R. H. N82-33351

O

OAKS, O. J., JR. N82-33364
OBRIEN, R. M. N82-33893
OCONNELL, R. F. N82-34185
OCONNOR, M. J. N82-34179
ODOHERTY, R. J. N82-33962
OGUZ, E. A. N82-33666
OHNUMA, T. N82-34253
OHTANI, S. N82-34236
OKAMOTO, M. N82-34249
OKAMURA, S. N82-34250
OKAZAKI, K. N82-34246
OKEEFE, D. R. N82-33560
OKUBO, Y. N82-34250
OKULSKI, M. A. N82-34088
OMALLEY, R. E., JR. N82-34141
ONEIL, E. F. N82-33768
N82-33769
ONEILL, K. N82-33974
ONEILL, W. D. N82-34038
OPRISHKO, A. A. N82-33990
ORAN, E. S. N82-33553
ORTEGA, L. J. N82-34218
ORTIZ, M. N82-33742
OSAFO-CHARLES, F. N82-34038
OSAWA, T. N82-34044
OSMER, S. R. N82-34230
OSSAKOW, S. L. N82-33937
OSTBERG, D. T. N82-33784
OVERDORF, R. L. N82-33363
OWEN, D. H. N82-34081
OYAMA, H. N82-34246

P

PADOVAN, J. N82-33390
PAGANO, M. N82-34145
N82-34176
PAGE, S. J. N82-33808
N82-33809
PAGLIETTI, A. N82-33746
PAJARI, M. N82-33585
PALACHEK, A. D. N82-34169
N82-34170
PALLA, R. L., JR. N82-33575
PALMADESSO, P. N82-34183
PALMER, E. N82-34063
PALMER, T. N82-33906
PANCHAL, C. B. N82-33677
PANCHAPAKESAN, S. N82-34165
PANDOLF, K. B. N82-34006
N82-34015
PARISH, T. R. N82-33987
PARK, K. C. N82-33740
PARKER, K. M. N82-33487
PARKER, M. A. N82-34005
PARR, A. C. N82-34198
PARR, V. B. N82-34298
PARZEN, E. N82-34146
N82-34153
N82-34173
N82-34174
N82-34175
PASHA, M. A. N82-34052
PASOUR, J. A. N82-33700
PATTERSON, R. H. N82-34219
PATTON, C. E. N82-34184
PAYNE, K. L. N82-33626
PEAUMONT, P. W. R. N82-33578
PEEBLES, P. Z., JR. N82-33617
PEEBLES, S. W. N82-33752
PEELE, W. D. N82-34340
N82-34341
PEKAU, O. A. N82-33759
PENG, S. S. N82-33582
PERKINS, G. S. N82-33681
PERLMUTTER, M. N82-33692
PERRY, S. J. N82-33456
PERSSON, S. E. N82-34320
PETERS, D. A. N82-33374
PETERSEN, R. H. N82-33344
PETERSON, G. L. N82-33940
PETERSON, R. A. N82-33380
PETROSIAN, V. N82-34197
N82-34326
PETTIT, F. S. N82-33504
PFEIFER, H. U. N82-33583
PHATAK, A. V. N82-34040
PHILLIPS, P. J. N82-33543
PHILLIPS, R. D. N82-33986
PHILLIPS, R. G. N82-33589
PICONE, J. M. N82-33553
PIERCE, G. A. N82-33734
PIETSCH, T. N82-33653
PILKEY, W. D. N82-33754
PINEGIN, B. V. N82-33994
PINELLI, T. E. N82-34300
PINSKY, P. M. N82-33742
PLATT, C. E. N82-33391

PLATZMAN, L. K. N82-34136
PLECKAUSKAS, A. V. N82-33555
PLESCIA, J. B. N82-34313
PLESS, L. D. N82-33597
PODOLSKI, W. F. N82-33487
POGGIO, T. N82-34019
POLINSKI, L. M. N82-33479
POOLE, D. R. N82-33840
PORITZKY, S. B. N82-33369
PORKOLAB, M. N82-34269
PORTER, J. A. N82-33594
POURSARTIP, A. N82-33445
POWELL, D. H. N82-34302
PRATT, T. K. N82-33391
PRE, J. N82-33464
PRELEC, K. N82-34266
PRESLES, H. N. N82-34228
PRESLES, J. M. N82-33464
PRESSOUYRE, G. M. N82-34106
PRICE, E. W. N82-33666
PRIMAK, W. N82-33544
PROTASOV, V. R. N82-33991
PULAT, B. M. N82-34079
PURVIS, J. W. N82-33758
PUSTERLA, M. N82-34203
PUTCHA, N. S. N82-33780

R

RACHOVITSKY, E. N82-33363
RAJENDRAN, A. M. N82-33738
RAMAPRIAN, B. R. N82-33680
RAMIAN, G. N82-33702
RAND, O. N82-33730
RAND, R. S. N82-33799
RANKIN, C. C. N82-33740
RANZIGER, H. N82-33803
RAO, P. V. N82-33493
RAPP, R. L. N82-33597
RASMUSSEN, W. T. N82-34012
RASSIOS, A. E. N82-33914
RATAJCZAK, A. F. N82-33828
RATHMILL, K. N82-33573
RAUH, R. D. N82-33710
N82-33867
RAWLS, J. M. N82-34267
N82-34274
RAY, R. L. N82-34034
RAYNE, J. A. N82-34281
RAYNER, C. N82-33906
REBELLO, C. A. N82-33778
REBELLO, C. J. N82-33778
REDDY, A. S. S. R. N82-33423
REDDY, J. N. N82-33776
N82-33780
REDDY, K. C. N82-33396
REDDY, V. U. N82-33600
REED, L. N82-33795
REED, L. W. N82-33383
REGAN, D. N82-34035
REHM, K. N82-34054
REICHENBACH, M. L. N82-33556
REID, M. A. N82-33463
REIF, H. E. N82-33551
REINKING, R. N82-33964
REITTER, T. A. N82-33675
N82-33676
REMONDINI, D. I. N82-34087
REMSBERG, E. E. N82-33890
RENKA, R. J. N82-34117
REPPERGER, D. W. N82-34056
RESIO, D. T. N82-33958
REYNOLDS, W. C. N82-33664
REZY, B. J. N82-33392
RHOADS, S. C. N82-33518
RHODES, C. G. N82-33499
RIBANDO, R. J. N82-33674
RICE, C. J. N82-34218
RICHARDS, W. F. N82-33612
RICHARDSON, T. W. N82-33717
RIEDEL, S. A. N82-34057
N82-34059
RIEDESEL, M. L. N82-34007
RIEGER, N. F. N82-33562
RIGBY, F. N82-33807
RIGGS, K. E. N82-33712
RINEHART, E. A. N82-33920
RISER, H. N82-33378
ROAPER, R. B. N82-33873
ROBBINS, D. O. N82-34018
ROBBINS, R. G. N82-34218
ROBBLEE, L. S. N82-34005
ROBERSON, C. W. N82-33700
ROBERTS, B. W. N82-33962
ROBERTS, C. W. N82-33943
ROBERTS, D. H. N82-34315
ROBERTS, L. N82-33334
ROCK, K. N82-34334
RODI, A. R. N82-33967
RODI, W. L. N82-33932
RODRIGUEZ, P. N82-33923
ROGERS, J. D. N82-33848
ROSCOE, B. A. N82-33790
ROSE, T. L. N82-33867
ROSEN, A. N82-33730
ROSEN, H. H. N82-34297
ROSENBERG, M. N82-33527
ROSENBERGER, J. L. N82-34181
ROSENBLUTH, M. N. N82-34268
ROSENFELD, A. N82-34110
ROSS, R. L. N82-33644
ROSSER, R. W. N82-33431
N82-33523
ROSSOW, M. P. N82-33374
ROTEM, A. N82-33437
ROTH, S. C. N82-33536
ROUFOSSE, M. C. N82-33944
ROUSE, W. B. N82-34065
ROUSSEAUX, G. N82-33908
N82-34025
ROUTH, D. E. N82-33634
ROYLANCE, D. N82-33525
RUBBEN, W. N82-34025
RUBENSTEIN, D. M. N82-33969
RUBIN, M. H. N82-33841
RUDERMAN, H. N82-33852
RUESS, J. C. N82-33376
RUETHER, J. A. N82-33692
RUGGERS, P. S. N82-33694
RUSH, J. E. N82-33430
RUSSELL, M. C. N82-33868
RYAN, B. M. N82-33924
RYERSON, D. E. N82-33942
RYOO, K. K. N82-33726
RYTHER, J. H. N82-33843

S

SAGDEO, P. M. N82-33666
SAHNI, S. N82-34090
SAILORS, D. B. N82-33936
SAKAMOTO, Y. N82-34246
SALAMA, M. N82-33751
SALISBURY, D. P. N82-33523
SALLET, D. W. N82-34338
SALOMON, M. N82-33834
SALTUS, R. W. N82-33943
SAMPSON, A. R. N82-34163
SANDERS, J. V. N82-34192
SANDLER, M. N. N82-33603
SANDRY, D. N82-34032
SARASON, I. G. N82-34031
SARPKAYA, T. N82-33352
SASS, S. L. N82-34287
SATAKE, T. N82-34239
SATHAYE, J. N82-33852
SATO, K. H. N82-34245
SAUNDERS, B. B. N82-33539
SAUNDERS, M. A. N82-34114
SAVAGE, R. O. N82-33644
SAVINO, J. M. N82-33932
SAVISAAR, A. N82-33384
SAVITS, T. H. N82-33336
N82-34164
SAWKA, M. N. N82-34017
SCAHILL, J. N82-33478
SCARAMANGAS, A. A. N82-33720
SCARF, F. L. N82-34326
SCHAEKEL, F. W. N82-33550
SCHAFFAR, M. N82-34196
SCHAFFNER, S. K. N82-33796
SCHAJER, G. S. N82-33566
SCHEER, E. K. N82-33929
SCHEPPELE, S. E. N82-33558
SCHERER, T. F. N82-34299
SCHINDLER, M. N82-34317
SCHMIDT-NIELSEN, A. N82-33599
SCHMIDT, D. L. N82-33534
SCHMIDT, E. W. N82-33840
SCHMITZ, M. N82-34319
SCHNEIDER, A. N82-33551
SCHNEIDER, W. N82-34301
SCHOENBACH, K. N82-33640
SCHOGGEN, W. O. N82-34322
SCHOWENGERDT, R. N82-34233
SCHREIFELS, J. A. N82-33466
SCHREYER, H. L. N82-33775
SCHUCANY, W. R. N82-34169
N82-34170
SCHULTZ, F. J. N82-33408
SCHULTZ, J. H. N82-34118
SCHUURMANS, H. J. A. N82-33905
SCHVANEVELDT, R., W. N82-34028
SCHWALM, N. D. N82-34029
N82-34030
SCHWARBER, A. J. N82-33444
SCHWEDOCK, J. P. N82-33551
SCOFIELD, C. N82-34013
SCOTT, B. C. N82-33381
SCOTT, I. G. N82-33690
SCOTT, T. E. N82-33669
SCOVILLE, A. N. N82-33710
N82-33867
SEAGRAVES, P. N82-34334
SEARS, W. E., III N82-34046
SEIBOLD, R. W. N82-33431
SEIDER, M. J. N82-33979
SEIFERT, D. J. N82-34064
SEILER, F. A. N82-33900
SEINER, J. M. N82-34189
SELLGREN, K. N82-34321
SELLMANN, P. V. N82-33648
SELTZER, S. M. N82-34023
SERDYUK, O. A. N82-33991
SESHADRI, V. N82-33628
SETHURAMAN, J. N82-34155
SHAFER, R. A. N82-33717
SHAH, Y. T. N82-33481
SHAKED, M. N82-34164
SHAKHGEDANOV, V. N. N82-33637
SHAMROTH, S. J. N82-34277
SHAPIRO, A. B. N82-33514
SHAPOVALOV, A. F. N82-33414
SHARIF-HOMAYOUN, A. N82-34298
SHARMA, G. C. N82-33634
SHARP, N. E. N82-33811
SHAUFL, R. A. N82-33724
SHAW, L. N82-34293
SHELBERG, M. C. N82-33604
SHELL, P. K. N82-33482
SHEPHERD, K. P. N82-34187
SHERIDAN, T. B. N82-34073
SHIEH, C. F. N82-33669
N82-33691
N82-33847
SHIH, H. M. N82-33436
SHIMIZU, K. N82-34249
SHIMKO, A. A. N82-33637
SHIMOZUMA, T. N82-34249
SHIN, R. T. N82-33614
SHIRACHI, D. K. N82-34055
SHIREY, G. A. N82-33812
SHIRLEY, R. D. N82-34298
SHLYAKHOV, V. I. N82-33933
SHORE, C. P. N82-33743
SHORE, R. A. N82-33604
SHORE, S. G. N82-33467
SHOUB, E. C. N82-34327
SHRIER, S. N82-33379
SHROADS, A. L. N82-34302
SHURI, F. S. N82-33940
SIBBERS, C. W. N82-33981
SIEGEL, A. F. N82-33931
SIEMENS, R. E. N82-33518
SIEPMANN, H. N82-33649
SIKORA, R. F. N82-33943
SILK, J. K. N82-34213
SILVERSTEIN, J. D. N82-33703
SILVERTHORN, J. T. N82-34052
SIMMONS, W. E. N82-33807
SIMON, M. N82-34291
SIMPSON, J. E. N82-34088
SINDONI, O. I. N82-34223
SINGER, I. L. N82-33500
SINGER, J. N82-33730
N82-33731
SINGH, C. P. P. N82-33481
SINGH, D. C. T. N82-33811
SINGH, J. J. N82-33435
SINGH, K. J. N82-33748
SINGH, M. N82-33923
SINGH, R. N82-33565
SINGHAL, S. C. N82-33655
SIVIOUR, J. B. N82-33576
SKIBO, M. D. N82-33656
SLATNER, R. C. N82-34201
SLAVIK, R. J. N82-33829
SLOMIANA, M. N82-33438
SLUYTERS, T. N82-34266
SMILLEY, J. D. N82-33633
SMISER, L. W. N82-33520
SMITH, A. N82-33540
SMITH, C. E. N82-33893
SMITH, C. L. N82-33552
SMITH, C. N. D. N82-33384
SMITH, D. B. S. N82-34127
N82-34128

SMITH, D. D. N82-33510
SMITH, D. E. N82-34003
N82-34181
SMITH, G. A., JR. N82-34060
SMITH, G. D. J. N82-33661
SMITH, G. W. N82-33670
SMITH, O. E. N82-33417
SMITH, W. H. N82-33515
SMYK, E. B. N82-33487
SNYDER, D. B. N82-33943
SOLOMON, J. M. N82-33415
SOLOMON, P. R. N82-33485
SONGRA, R. R. N82-33811
SORENSEN, D. C. N82-34134
SOVEY, J. S. N82-33521
SPEAR, R. C. N82-34077
SPEZAMIGLIO, A. N82-34152
SPICER, C. W. N82-33897
SPIRO, C. L. N82-33480
SQUIRRELL, H. C. N82-33817
ST.CLAIR, A. K. N82-33530
ST.CLAIR, T. L. N82-33530
STACY, A. B., JR. N82-33419
STAINBROOK, G. N82-34015
STALLINGS, S. A. N82-33930
STAMBLER, B. N82-33886
STARR, G. P. N82-34072
STEFANSKI, P. K. N82-34102
STEGEN, G. E. N82-33484
STEINBERG, L. I. N82-33650
STEINBROOK, R. A. N82-33984
STENCEL, R. E. N82-34316
N82-34317
STENGEL, R. F. N82-34053
STENGER, J. B. N82-33671
STEPHENS, J. B. N82-33567
STERBA, J. A. N82-33998
STERLIKOV, A. V. N82-33992
STERN, R. A. N82-33609
STETSON, A. R. N82-33494
STEVENS, I. N82-34012
STEVENS, K. W. N82-34010
STIEGEL, G. J. N82-33479
STIRLING, W. L. N82-34211
STOCKBAUER, R. N82-34198
STOCKER, H. L. N82-33669
STOCKWELL, R. D. N82-33719
STOKES, C. S. N82-33921
STOLYAROV, A. K. N82-33637
STORAASLI, O. O. N82-33752
STOVALL, T. K. N82-33857
STRACK, O. D. L. N82-33673
STRAHL, G. A. N82-33380
STRAHLE, W. C. N82-33666
STRIFFLER, C. D. N82-33625
STRONG, L. D. N82-34086
STUCKAS, K. J. N82-33392
STUREK, W. B. N82-33353
SU, C. W. N82-33552
SU, W. F. A. N82-33545
SUBRAMANIAN, K. N. N82-33506
SUBRAMANIAN, N. R. N82-33346
SUCHOW, L. N82-33572
SULLIVAN, J. D. N82-34326
SULLIVAN, N. N82-33384
SUMBERA, M. N82-34207
SUNDBERG, W. D. N82-34217
SURANYI, P. N82-34215
SVERDRUP, G. M. N82-33897
SVINOS, J. G. N82-33671
SWIFT, W. M. N82-33487
SWINNEY, M. N82-33923
SYAMAL, P. K. N82-33759
SYMANSKI, J. J. N82-34219
SZABO, B. A. N82-33749
SZCZYPA, J. N82-33462
SZEDON, J. R. N82-33842
SZUSZCZEWICZ, E. P. N82-33923

T

TABOR, W. H. N82-33910
TABORS, R. D. N82-33859
TAFF, L. G. N82-34324
TAHA, S. N82-33716
TANAHASHI, S. N82-34239
N82-34241
N82-34246
TANAKA, K. N82-33472
N82-33473
N82-34044
N82-34051
TANAKA, S. N82-34249
TANEJA, D. N. N82-33651
TANG, C. M. N82-33704
TANIMOTO, M. N82-34254
TANTON, G. A. N82-33611
TARKINGTON, T. W. N82-33895
TASHJIAN, B. M. N82-34298
TAVLARIDES, L. L. N82-33474
TAYLOR, R. L. N82-33742
TAZIMA, T. N82-34238
TEMPLE, B. N82-33678
TEPLOV, L. F. N82-33406
TERUMICHI, Y. N82-34249
THEILIG, E. N82-33459
THILL, R. E. N82-33582
THOENES, J. N82-33697
THOMAS, J. M. N82-33427
THOMAS, S. D. N82-33346
THOMPSON, J. A. N82-33426
THOMPSON, R. L. N82-33744
THOMSON, D. B. N82-34273
THORPE, W. G. N82-33930
THROOP, J. F. N82-33439
THURLIN, R. N82-33394
TIMS, J. M. N82-34025
TISCHER, R. E. N82-33479
TOBAK, J. P. N82-33643
TOLLE, D. A. N82-33898
TOMITA, Y. N82-34237
TOMLINSON, J. J. N82-33857
TOMPKINS, J. A. N82-33408
TOPPING, R. F. N82-33488
TORSANI, J. A. N82-33794
TORTORELLO, A. J. N82-33532
TRACY, F. T. N82-33772
TRAINOR, D. N82-34201
TREMBLEY, N. N82-33371
TRIGGIANI, R. N82-34149
TRUCANO, T. G. N82-33786
TRUCHOT, A. N82-34025
TRYGAR, T. A. N82-33658
TRYON, H. B. N82-33636
TSITSIKLIS, J. N. N82-33770
TSUI, Y. Y. N82-33396
TSUZUKI, T. N82-34237
TU, S. W. N82-33680
TUCKER, J. R. N82-33392
TUNG, C. N82-33345
TURKEL, E. N82-34191
TUTELYAN, V. A. N82-33989
TUTTLE, M. H. N82-33405

U

UBRI, M. K. N82-33811
UENO, I. N82-34254
UKEGAWA, K. N82-34237
ULBRICH, C. W. N82-33947
ULITCHNY, M. G. N82-33513
UNTERZUBER, R. N82-34216
UPATNIEKS, J. N82-34225
URAMOTO, J. N82-34240
UREVIG, D. S. N82-34218
USTINOV, L. M. N82-33433
UTKU, S. N82-33751

V

VAHRENKAMP, R. N82-34091
VALAND, T. N82-33460
VALAVANI, L. N82-34182
VALENTINO, G. J. N82-34067
VALI, G. N82-33948
VALLABHAN, C. V. G. N82-33547
VANBAALEN, J. N82-34129
N82-34130
N82-34131
VANDEREECKEN, J. N82-34292
VANDERGLAS, E. N82-33545
VANDERWEE, P. N82-33906
VANDINE, L. L. N82-33881
VANHOWE, K. R. N82-34298
VANLANDINGHAM, H. F. N82-33399
VANSELOW, R. N82-33469
VANVALKENBURG, E. S. N82-33693
VANVORIS, P. N82-33898
VARDULAKIS, A. I. G. N82-34159
VARMA, R. N82-33486
VELTFORT, N. N82-33577
VENKAYYA, V. B. N82-33741
VEPREK-SISKA, J. N82-33465
VICTOR, D. M. N82-34302
VIECHNICKI, D. J. N82-34279
VIKMANIS, M. N82-34039
N82-34040
VINCENT, C. L. N82-33958
VISWANADHAM, Y. N82-33794
VITEK, J. M. N82-33515
VITERNA, L. A. N82-33830
VOGAN, J. W. N82-33494
VOGEL, G. J. N82-33487
VOKAL, S. N82-34207
VOLMAN, V. I. N82-33637
VOLPANO, D. N82-34108
VOORHEES, J. W. N82-33387
VORONTSOV, A. A. N82-33933
VU, B. Q. N82-33767
VYCE, J. M. N82-33589

W

WADE, W., JR. N82-33833
WAGNER, E. S. N82-33870
WALKER, D. N. N82-33923
WALKER, J. H. N82-33539
WALLCRAFT, A. J. N82-33977
WALLER, B. G. N82-33813
WALSH, P. N82-34278
WALSH, R. W. N82-34129
N82-34130
N82-34131
WALTER, G. M. N82-34195
WALTERS, I. J. N82-33555
WALTERS, M. M. N82-33651
WAN, C. A. N82-33575
WANG, A. S. D. N82-33438
WANG, B. P. N82-33754
WANG, B. Y. T. N82-33547
WANG, D. W. N82-33749
WANG, L. K. N82-33882
N82-33902
WANG, M. H. N82-33882
WANNAMAKER, B. N82-33973
WARD, C. C. N82-34020
WARDLAW, A. B., JR. N82-33409
N82-33415
WARDRIP, S. C. N82-33364
WARREN, H. F. N82-33364
WASHBURN, A. R. N82-34178
WASHIZU, K. N82-34044
N82-34051
WATANABE, T. N82-34253
WATSON, D. C. N82-33442
WATSON, G. S. N82-34180
WATSON, L. G. N82-33761
WATSON, L. T. N82-33741
WATSON, W. R. N82-34190
WEATHERFORD, W. D., JR. N82-33550
WEAVER, D. L. N82-33982
WEEDON, M. N82-34109
WEI, K. C. N82-34039
N82-34040
WEILER, R. L. N82-33625
WEISS, J. A. N82-33615
WEISSMANN, S. N82-33774
WELCH, B. M. N82-34091
WELLS, J. K. N82-33446
WELSH, D. J. A. N82-34140
WENGLARZ, R. A. N82-33876
WERTHEIM, R. J. N82-33881
WESCOTT, T. F. N82-34107
WEST, B. J. N82-33628
WEST, C. D. N82-33849
WEST, G. B. N82-33797
WEST, J. N82-34012
WEWERINKE, P. H. N82-34041
WEXLER, R. L. N82-33952
WHARTON, W. W. N82-33548
WHITCOMB, S. E. N82-34321
WHITE, D. J. N82-33827
WHITE, J. M. N82-33466
N82-33472
N82-33473
WHITE, T. N. N82-34069
WIBERLEY, S. E. N82-33434
WICKENS, C. D. N82-34032
WIERZBICKI, T. N82-33765
WILLER, R. L. N82-33533
WILLETT, J. A. N82-33417
WILLIAMS, J. N82-34008
N82-34188
WILLIAMS, L. A. N82-33862
WILLIAMS, M. S. N82-33733
WILLIAMS, T. A. N82-33875
WILLIFORD, R. E. N82-33875
WILSON, C. N82-33795
WINSMAN, F. B. N82-34006
WITHEROW, W. K. N82-33683
WITHERS, R. S. N82-33615
WITZMANN, F. A. N82-33997
WOJCIECHOWSKI, C. J. N82-33712
WOLFE, J. W. N82-34010

WOLFSON, R. N82-34256
WOLOVICH, W. A. N82-34133
WONG, S. C. N82-33753
WOOD, M. J. N82-33539
WOODLEY, W. L. N82-33963
WOODWARD, N. B. N82-33912
WRIGHT, B. R. N82-33550
WRIGHT, M. H. N82-34114
WU, C. N82-33593
WU, W. Z. N82-33566
WYNNE, E. C. N82-33736

X

XIEYUAN, Y. N82-33665
XIWEN, Z. N82-33429

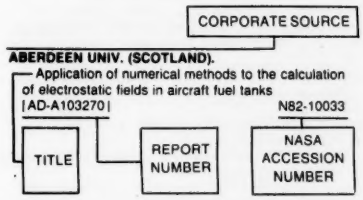
Y

YAFFE, R. N82-33731
YAMASHINA, T. N82-34239
YAMASHITA, H. N82-33679
YANCEY, M. E. N82-33682
YANG, C. N82-33528
YANO, K. N82-34246
YAO, N. P. N82-33486
YARLYKOV, M. S. N82-33602
YASUDA, M. N82-34101
YASUKAWA, E. N82-34334
YATES, E. C., JR. N82-33736
YEAGER, E. B. N82-33538
YEE, C. L. N82-34258
YERGEY, A. L. N82-33468
YOUNG, F. C. N82-33638
YOUNG, G. D., JR. N82-33363
YOUNG, G. E. N82-34077
YOUNG, J. B. N82-33662
YOUNG, R. M. N82-34218
YOUNG, S. G. N82-33493
YOUNG, T. R. N82-33553
YOUNGBERG, C. L. N82-33567
YU, C. F. N82-34039
YUNG, D. T. N82-33677
YURA, J. A. N82-33788

Z

ZACHARIAS, G. N82-34066
ZACK, S. N82-33725
ZAFRAN, S. N82-33424
N82-33425
ZAKRAYSEK, L. N82-33718
ZARDECKI, A. N82-33899
ZAVADA, J. M. N82-33708
ZAYCHIKOV, B. P. N82-33933
ZEDONG, C. N82-33701
ZEID, I. N82-33390
ZIMMERMAN, A. H. N82-33823
N82-33836
ZIRIN, H. N82-34329
ZUCCA, R. N82-34091
ZWICK, H. N82-34018
ZWICKE, P. E. N82-33399

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ABERDEEN PROVING GROUND, MD.
Data compression for transient measurements
[AD-A117100] N82-34093

ACRES AMERICAN, INC., BUFFALO, N.Y.
Integrated environmental and safety assessment of selected mechanical energy storage systems
[DE82-902073] N82-33851

ADVANCED FUEL RESEARCH, INC., EAST HARTFORD, CONN.
Coal gasification reactions with on-line in-situ FTIR analysis
[DE82-005658] N82-33485

ADVANCED RESEARCH AND APPLICATIONS CORP., SUNNYVALE, CALIF.
Study of fatigue durability of advanced composite materials under conditions of accelerated loading
[NASA-CR-166405] N82-33436
Accelerated fatigue durability of a high performance composite
[NASA-CR-166407] N82-33437

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
A spectrum analyser for acoustic emission
[AD-A117720] N82-33690

AEROSPACE CORP., EL SEGUNDO, CALIF.
High power transportable VLF transmitter facility
[AD-A117419] N82-33623
Nickel-cadmium cell performance recovery and reconditioning
[SD-TR-82-63] N82-33823
Short-circuit formation during NiCd cell reversal
[AD-A117912] N82-33836
The aerospace long-path multiple reflection cell facility
[SD-TR-82-60] N82-34218

AEROSPACE CORP., LOS ANGELES, CALIF.
Framework for power-network analysis
[DE82-012724] N82-33658

AEROSPACE MEDICAL RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.
Variations in noise dosimeter readings of fluctuating noise
[AD-A115763] N82-34002
A performance analysis study of a complex G field experiment N82-34056

AIR FORCE HUMAN RESOURCES LAB., BROOKS AFB, TEX.
Figures of merit: Use and interpretation in evaluating program alternatives
[AD-A117233] N82-34295

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Effects of higher order control systems on aircraft approach and landing longitudinal handling qualities N82-34052
Weapon system software acquisition and support: A theory of system structure and behavior
[AD-A115555] N82-34103

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, BOLLING AFB, WASHINGTON, D.C.
AFOSR Research Meeting on Diagnostics of Reacting Flow
[AD-A117075] N82-33668
The 26th AFOSR chemical and atmospheric sciences program review FY81
[AD-A117325] N82-33930

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Aeronautical knowledge (selected articles)
[AD-A115649] N82-33335
Principles of the radio control of pilotless objects (selected chapters)
[AD-A117547] N82-33377
Device for the control of free-spinning models in a wind tunnel
[AD-A115993] N82-33406
China's newly designed and built aircraft engine test stand
[AD-A117569] N82-33410
Dictionary of missile and artillery terms
[AD-A115995] N82-33414
The analysis for regulation performance of a variable thrust rocket engine control system
[AD-A117495] N82-33429
Reference book for the nitrogen industry worker in two volumes, volume 1
[AD-A115651] N82-33569
Numerical results of the theory of diffraction of radio waves around the surface of the Earth (selected sections)
[AD-A115668] N82-33601
Integrated systems of automatic radio equipment
[AD-A115670] N82-33602
Waveguide Y-circulator
[AD-A112086] N82-33637
Servo systems of combined control
[AD-A115994] N82-33639
Acta Mechanica Sinica (selected articles)
[AD-A115634] N82-33665
Waveguide gas laser
[AD-A115648] N82-33701
Methods and techniques of experimental research on the atmosphere (selected articles)
[AD-A117570] N82-33933
Time-frequency and space-frequency characteristics of optical modulators
[AD-A115650] N82-34221

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Terrain following/terrain avoidance system concept development N82-33363
Mechanical properties of E293/1581 fiberglass-epoxy composite and several adhesive systems
[AD-A117902] N82-33442
Advanced carbon fabric/phenolics for thermal protection applications
[AD-A116829] N82-33534
KQ measurements with rheometrics mechanical spectrometer
[AD-A117903] N82-33781

AIR UNIV., MAXWELL AFB, ALA.
MISIL, too big to fly
[AD-A117940] N82-34303

AKRON UNIV., OHIO.
Engine dynamic analysis with general nonlinear finite element codes. Part 2: Bearing element implementation overall numerical characteristics and benchmaking
[NASA-CR-167944] N82-33390

ALABAMA UNIV., HUNTSVILLE.
Containerless processing technology analysis
[NASA-CR-170624] N82-33430

ALBANY INTERNATIONAL CORP., DEDHAM, MASS.
Seamless collapsible fuel tanks, phase 1
[AD-A116765] N82-33714

AMERICAN SCIENCE AND ENGINEERING, INC., ARLINGTON, VA.
A program to study the detection of target hits by directed energy weapons
[AD-A117711] N82-34213

AMERICAN UNIV., WASHINGTON, D. C.
Establishing a reliable source of fuel for Department of Defense requirements: Effective petroleum, oil and lubricant financial management
[PB82-170812] N82-34299

AMORPHOUS MATERIALS, INC., GARLAND, TEX.
Large plate CdTe synthesis by sealed vessels transport
[AD-A117524] N82-34286

ANALYSIS AND TECHNOLOGY, INC., NORTH STONINGTON, CONN.
Preliminary assessment of US Coast Guard Short Range Recovery (SRR) Forward Looking Infrared (FLIR) system small target detection performance
[AD-A117916] N82-34230

ANALYTIC SCIENCES CORP., READING, MASS.
Pilot model hypothesis testing N82-34047

ANALYTICAL MECHANICS ASSOCIATES, INC., MOUNTAIN VIEW, CALIF.
Modeling human target acquisition in ground-to-air weapon systems N82-34040

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
Techniques for Doppler spectral estimation of HF radar signals backscattered from high latitude ionosphere irregularities
[AD-A116838] N82-33613

APPLIED RESEARCH, INC., HUNTSVILLE, ALA.
Beta experiment flight report
[NASA-CR-170622] N82-33698
Beta experiment
[NASA-CR-162087] N82-33699

ARGONNE NATIONAL LAB., ILL.
Raman spectroscopy for in-situ monitoring of electrode processes
[DE82-014909] N82-33486
Technical evaluation: Pressurized fluidized-bed combustion technology
[DE82-014903] N82-33487
Effects of ionization on silicate glasses
[DE82-012595] N82-33544
Influence of sulfation-enhanced salt additives on the corrosion behavior of materials in atmospheric fluidized-bed combustors
[DE82-010204] N82-33670
An assessment of heat-transfer correlations for turbulent water flow through a pipe at Prandtl numbers of 6.0 and 11.6
[DE82-014426] N82-33677
Newton's method
[DE82-013692] N82-34134

ARINC RESEARCH CORP., ANNAPOLIS, MD.
Reliability, Availability, Maintainability Data Tracking Plan improved GUARDRAIL 5
[AD-A117933] N82-33378
Development of avionics installation interface standards
[AD-A116853] N82-33384

ARIZONA STATE UNIV., TEMPE.
A primer on sulfur for the planetary geologist
[NASA-CR-3594] N82-33459

ARIZONA UNIV., TUCSON.
A model of subjective probabilities from small groups N82-34054
A summary discussion of CONLAN
[AD-A117461] N82-34113
Research directed at developing a classical theory to describe isotope separation of polyatomic molecules illuminated by intense infrared radiation
[DE82-009652] N82-34208
Optical computations for image bandwidth compression
[AD-A117722] N82-34233

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, ABERDEEN PROVING GROUND, MD.
Flight instabilities of spinning projectiles having non-rigid payloads
[AD-A117311] N82-33354
An apparatus for the measurement of pulmonary function in unanesthetized small animals
[AD-A114938] N82-33985
Calculation on optical effect of matter from first principles using group theoretical techniques
[AD-A117310] N82-34223

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
Universal turret system model determination and controller performance testing
[AD-A117687] N82-33380
A new analysis of the unwinding ribbon as a delayed arming device
[AD-A117352] N82-33571
A SPICE2 model for the M732 analog timer integrated circuit
[AD-A117012] N82-33643
CO2 laser waveguiding in GaAs MBE layers
[AD-A117394] N82-33708
The shock front rise time in water
[AD-A117426] N82-34228

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
A fracture and ballistic penetration resistant laminate
[AD-A117142] N82-33439
Asymptotic and numerical methods for vector systems of singularly-perturbed boundary value problems
[AD-A117111] N82-34141

ARMY AVIONICS RESEARCH AND DEVELOPMENT ACTIVITY, FORT MONMOUTH, N. J.
Voice Interactive Systems Technology Avionics (VISTA) Program
[AD-A117288] N82-33383

ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
Improving electric grounding in frozen materials
[AD-A117873] N82-33648
Sea ice rubble formations in the Bering Sea and Norton Sound, Alaska
[AD-A113773] N82-33801
Snowpack profile analysis using extracted thin sections
[AD-A117839] N82-33957

ARMY COMMUNICATIONS-ELECTRONICS COMMAND, FORT MONMOUTH, N.J.
Responses of FM/CW systems having filters
[AD-A117400] N82-33621
Fluoropolymer barriers to stress corrosion in optical fibers
[AD-A117346] N82-34224

ARMY CONSTRUCTION ENGINEERING RESEARCH LAB., CHAMPAIGN, ILL.
A method of polymer design and synthesis for selective infrared energy absorption
[AD-A117485] N82-33540
Arc-sprayed metals for structural electromagnetic shielding
[AD-A117673] N82-33629
Spectral equivalence of deterministic and stochastic models for time series with a periodic component
[AD-A117718] N82-34179

ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND, FORT MONMOUTH, N. J.
A novel beam bunching concept for millimeter wave tubes
[AD-A117107] N82-33608

ARMY ELECTRONICS TECHNOLOGY AND DEVICES LAB., FORT MONMOUTH, N. J.
Dielectric waveguide antenna
[AD-A117305] N82-33609
The planar doped barrier: A new class of electronic devices
[AD-A117307] N82-33644
High energy surfuryl chloride batteries
[AD-A117106] N82-33833
Properties of SOC12 electrolyte solutions
[AD-A117306] N82-33834
Utilization of quantum distribution functions for ultra submicron device transport
[AD-A117433] N82-34280

ARMY ENGINEER TOPOGRAPHIC LABS., FORT BELVOIR, VA.
Applying photogrammetry to real time collection of digital image data
[AD-A116770] N82-33687
An analysis of the max-min texture measure
[AD-A116768] N82-33799
Ray tracing methods for calculation of atmospheric refraction
[AD-A116766] N82-33928
A general climatological guide to daily freezing conditions: Frost days, ice days and freeze-thaw days
[AD-A116771] N82-33952

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Pumping performance and turbidity generation of model 600/100 PNEUMA pump. Main text and appendixes A and B
[AD-A117854] N82-33717
Durability of reinforced concrete beams exposed to marine environment
[AD-A117284] N82-33768
Durability of post-tensioned concrete beams exposed to severe natural weathering
[AD-A13130] N82-33769
A three-dimensional stability analysis/design program (3DSAD). Report 3. General Analysis Module (CGAM)
[AD-A117387] N82-33772
Engineering geology and geomorphology of streambank erosion. Report 3: The application of waterborne geophysical techniques in fluvial environments
[AD-A115678] N82-33892
Natural processes influencing terrain attributes. Report 1: Prediction of residual soil texture in humid temperature climates of the Federal Republic of Germany and selected analogous portions of the United States, pilot study
[AD-A116939] N82-33926
New pressure test for determining coefficient of permeability of rock masses
[AD-A116982] N82-33927
Atlantic coast water-level climate
[AD-A117147] N82-33951
Objective specification of Atlantic Ocean wind fields from historical data
[AD-A117683] •N82-33958

ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Attenuation of high intensity reradiated light by photochromic glass
[AD-A117424] N82-34227
Resolution of factors responsible for difficulty in growing single crystals of YAG
[AD-A117401] N82-34279

ARMY MISSILE COMMAND, REDSTONE ARSENAL, ALA.
Laser induced polymerization reactions in solid propellant binders
[AD-A117158] N82-33548
Active imaging of range targets at 1.2 millimeters
[AD-A117161] N82-33611
A new midinfrared laser in hydrogen
[AD-A117162] N82-33705
Micom program in light control by light
[AD-A117159] N82-33706
Turbulence analysis by use of the fast Fourier transform
[AD-A117157] N82-33953
Photonic seeker development
[AD-A117160] N82-34225

ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT CENTER, FORT BELVOIR, VA.
New viewpoints in mass filter design
[AD-A117295] N82-33468

ARMY NATICK RESEARCH AND DEVELOPMENT COMMAND, MASS.
Development of methods for assessment of gliding parachute applications
[AD-A117103] N82-33356

ARMY PROPULSION LAB., CLEVELAND, OHIO.
Thermal fatigue behavior of FP alumina/magnesium composites
[AD-A117292] N82-33440

ARMY RESEARCH AND TECHNOLOGY LABS., FORT EUSTIS, VA.
The aerodynamic influences of rotor blade taper, twist, airfoils and solidity on hover and forward flight performance
[AD-A117397] N82-33357

ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
Finite difference modeling of rotor flows including wake effects
[NASA-TM-84280] N82-33345
Speech Command Auditory Display System (SCADS)
[AD-A117486] N82-33387

ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Respiratory adaptation to acute metabolic acidosis in goats with ablated carotid bodies
[AD-A116657] N82-33984
Prolonged self-paced hard physical exercise comparing trained and untrained men
[AD-A116608] N82-34006
Acute albumin-induced plasma volume expansion and exercise in the heat: Effects on hormonal responses in men
[AD-A115180] N82-34017
Effectiveness of ice (water) packets vests in reducing heat stress
[AD-A117864] N82-34021
Microclimate cooling for combat vehicle crewmen
[AD-A117156] N82-34083
Low temperature tests of rescue breathing apparatus
[PB82-172727] N82-34086

ARMY TANK-AUTOMOTIVE RESEARCH AND DEVELOPMENT COMMAND, WARREN, MICH.
Characterization of adhesively bonded aluminum armor through qualitative analytical techniques
[AD-A117710] N82-33784

ARNOTT (DOUGLAS R.), HUNTINGTON STATION, N.Y.
Does man always close the loop in trying to pilot a large ship? N82-34068

ATMOSPHERIC SCIENCES LAB., WHITE SANDS MISSILE RANGE, N. MEX.
An empirical model for near millimeter wave snow extinction and backscatter
[AD-A117350] N82-33610

AUBURN UNIV., ALA.
A simulation language approach to structural interaction problems N82-33758

AVCO-EVERETT RESEARCH LAB., MASS.
Research on sources of gas phase metastable atoms and molecules
[AD-A117672] N82-34201

B

BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Computations of projectile Magnus effect at transonic velocities
[AD-A117313] N82-33353
Navier-Stokes computations for conventional and hollow projectile shapes at transonic velocities
[AD-A116866] N82-33355
A simple quadrature formula from Simpson's rule applicable for odd or even n
[AD-A116867] N82-34148

BATTELLE COLUMBUS LABS., OHIO.
Thermal effects in rolling/sliding contact
[AD-A117702] N82-33719
Nitrogen oxide transformations in power-plant plumes
[DE82-901847] N82-33897
Evaluation of terrestrial microcosms for assessing ecological effects of utility wastes
[DE82-903730] N82-33898

BATTELLE MEMORIAL INST., RICHLAND, WASH.
Dosimetric and behavioral analysis of microwave-drug synergistic effects on operant behavior in the rat
[AD-A115115] N82-33986

BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Development of a solid absorption process for removal of sulfur from fuel gas
[DE82-012996] N82-33484

BDM CORP., ALBUQUERQUE, N. MEX.
An evaluation of the relative performance of three infrared imagers through fog
[AD-A116893] N82-34222

BDM CORP., MONTEREY, CALIF.
Factors relating surface visibility to the total optical depth in the marine regime
[AD-A117836] N82-34232

BEAM ENGINEERING, INC., SUNNYVALE, CALIF.
Ensemble averaging of acoustic data N82-34102

BEN GURION UNIV. OF THE NEGEV, SEDE BOQER (ISRAEL).
A dynamical model for prediction of formation, growth and dissipation of a cloud
[AD-A117452] N82-33955

BENDIX CORP., KANSAS CITY, MO.
Blended elemental titanium alloys
[DE82-012882] N82-33513
Electronic tester study
[DE82-016028] N82-33657
Resolution of contamination problems affecting laser surface certification inspection
[DE82-008775] N82-33711
Semirigid coaxial RF cable bending techniques
[DE82-016029] N82-33785

BENDIX FIELD ENGINEERING CORP., GRAND JUNCTION, COLO.
Airborne gamma-ray spectrometer and magnetometer survey: Alturas Quadrangle, California
[DE82-005539] N82-33805
Grand Junction Area Office, United States Department of Energy 1980/1981 activities report
[DE82-009638] N82-33806

BETH ISRAEL HOSPITAL, BOSTON, MASS.
Ventilatory responses to exercise while eliciting the relaxation response
[AD-A115102] N82-34015

BIONETICS CORP., HAMPTON, VA.
NORSEX 1979 microwave remote sensing data report
[NASA-CR-165967] N82-33796

Broad band sound from wind turbine generators
[NASA-CR-165810] N82-34187

BITUMINOUS COAL RESEARCH, INC., MONROEVILLE, PA.
Field survey of float dust in coal mining operations
[PB82-172719] N82-33812

BOEING AEROSPACE CO., SEATTLE, WASH.
High-aspect-ratio silicon-cell metallization
[DE82-011687] N82-33861

Development and test of a digital/optical linear position transducer
[AD-A117918] N82-34231

BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Aircraft alerting systems standardization study. Phase 4: Accident implications on systems design
[AD-A117876] N82-33388

BOEING COMPUTER SERVICES, INC., SEATTLE, WASH.
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Beverly High School, Beverly, Mass.
[DE82-008622] N82-33879

BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
The effects of multiplicative motor noise on the optimal human operator model N82-34042

PROCRU: A model for analyzing flight crew procedures in approach to landing N82-34066

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Atomization characteristics of coal-water mixtures
[DE82-009093] N82-33477

Toxicity of silicon compounds
[DE82-014245] N82-34022

Extrapolation algorithms and their use for the evaluation of beam-beam effects on the motion and polarization of particles in storage rings
[DE82-011425] N82-34203

BNL neutral-beam development group
[DE82-008852] N82-34266

BROWN BOVERI ELECTRIC, INC., CHALFONT, PA.
The 1200-kV system study
[DE82-014512] N82-33659

BROWN UNIV., PROVIDENCE, R. I.
An automated optical display system for visual physiology experiments
[AD-A116499] N82-34004

Neuron selectivity: Single neuron and neuron networks
[AD-A116886] N82-34013

Practical methods for the compensation and control of multivariable systems
[AD-A117728] N82-34133

Perturbation of homoclinics and subharmonics in Duffing's equation
[AD-A117390] N82-34152

BUREAU OF MINES, ALBANY, OREG.
Solvent extraction of nickel and copper from laterite-ammoniacal leach liquors
[PB82-176587] N82-33518

Zirconium oxide molds for small molybdenum investment castings
[PB82-202995] N82-33519

BUREAU OF MINES, PITTSBURGH, PA.
An evaluation of 3 wet dust control techniques for face drills
[PB82-177320] N82-33808

Evaluation of the use of foam for dust control on face drills and crushers
[PB82-176215] N82-33809

Monitoring of submicrometer particles in sealed fire areas
[PB82-175951] N82-33810

BUREAU OF RADIOLOGICAL HEALTH, ROCKVILLE, MD.
Performance evaluation of RF electric and magnetic field measuring instruments
[PB82-195009] N82-33694

BURT, HILL, KOSAR, RITTLEMAN, AND ASSOCIATES, BUTLER, PA.
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865

C

CAGLIARI UNIV. (ITALY).
Interaction of heat production, strain rate and stress power in a plastically deforming body under tensile test N82-33746

CALIFORNIA INST. OF TECH., PASADENA.
Part 1: Ancient arctic ice does not contain large excesses of natural lead. Part 2: Chronological variations in lead and barium concentrations and lead isotopic compositions in sediments of four southern California off-shore basins N82-33791

Observations of the reflection nebula NGC 7023 at 2.2 microns N82-34321

Interferometric observations of solar flare precursors at 10.6 GHz
[AD-A115870] N82-34329

CALIFORNIA UNIV., BERKELEY.
Band saw and circular saw vibration and stability N82-33566

Operator split methods in the numerical solution of the finite deformation elastoplastic dynamic problem N82-33742

Technology assessment of solar-energy systems. Part 1: An analysis of life-cycle costs of solar facilities. Part 2: Minerals critical to the development of future energy technologies in high and low solar scenarios
[DE82-012339] N82-33852

Application of control theory to dynamic systems simulation
[NASA-CR-166383] N82-34077

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Development of a direct-absorption high-temperature gas receiver
[DE82-010168] N82-33838

CALIFORNIA UNIV., DAVIS.
Theoretical and practical considerations of some aspecis of gas chromatographic optimization N82-33453

Geology and evolution of the magmatic rocks of the Vourinos Ophiolite, northern Greece N82-33914

Mechanisms of change in plasma volume to acute and chronic exercise in man N82-33999

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-014875] N82-33444

Molten phosphate electrolyte for the electrolysis of water
[DE82-008211] N82-33482

Aluminum/cuprous oxide thermite
[DE82-012866] N82-33514

Calorimetric measurements of emittance of pipe surfaces: Influence of enclosure diameter, test pipe length and an argon atmosphere
[DE82-009404] N82-33675

Design and operation of an apparatus for calorimetric emittance measurements of pipe surfaces
[DE82-008713] N82-33676

Summary of Thomson-scattering data from the Tandem Mirror Experiment (TMX)
[DE82-014956] N82-34272

CALIFORNIA UNIV., LOS ANGELES.
Characterization of infrared optical properties of layered semiconductors
[AD-A117729] N82-34285

CALIFORNIA UNIV., SAN DIEGO.
Spatial distributions of phytoplankton: Limitations of power spectrum techniques N82-33968

CALIFORNIA UNIV., SAN DIEGO, LA JOLLA.
Solar flare studies
[AD-A114269] N82-34330

CALIFORNIA UNIV., SANTA BARBARA.
Design of the UCSB FEI electron beam system
[AD-A115937] N82-33702

CAMBRIDGE UNIV. (ENGLAND).
Supersonic cascade flows with subsonic axial Mach number
[CUED/A-TURBO/TR-110] N82-33343

Damage accumulation during fatigue of composites
[PB82-182312] N82-33445

Correlations for the fracture of composite materials
[PB82-181421] N82-33446

Hygrothermal effects on the micromechanisms of crack extension in glass fibre and carbon fibre composites
[PB82-176728] N82-33447

Practical applications of hot-isostatic pressing diagrams: Four case studies
[PB82-182338] N82-33574

Cracking and toughness of concrete and polymer-concrete dispersed with short steel wires
[PB82-180589] N82-33578

Flow phenomena in compressor casing treatment
[CUED/A-TURBO/TR-112] N82-33661

The fluid mechanics of non-nucleating wet steam flows
[CUED/A-TURBO/TR-111] N82-33662

Longitudinal shrinkage of eccentric single-pass welds
[PB82-174731] N82-33720

Finite difference approximations and stability of distributed parameter systems
[PB82-177635] N82-34158

Structure and Smith-MacMillan form of a rational matrix at infinity
[PB82-178625] N82-34159

James Clerk Maxwell's Cambridge manuscripts: Extracts relating to control and stability, part 1
[PB82-180571] N82-34160

CANADA INST. FOR SCIENTIFIC AND TECHNICAL INFORMATION, OTTAWA (ONTARIO).
Technique for the aerobic cultivation of microorganisms in water-in-oil emulsions
[NRC/CNR-TT-2031] N82-33980

Computer-aided design, drawing and manufacturing system for dies and molds
[NRC/CNR-TT-2030] N82-34101

CARNEGIE INSTITUTION OF WASHINGTON, D. C.
Observations of the reflection nebula NGC 7023 at 2.2 microns N82-34321

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Physical-chemical properties of articulated rodlike polymers
[AD-A117904] N82-33542

A program of research on microfabrication techniques for VLSI magnetic devices
[AD-A117922] N82-34281

CASE INST. OF TECH., CLEVELAND, OHIO.
Integration of multidimensional regions with applications to finite element analysis N82-33750

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Compressibility of colloids. 1: Compressibility studies of aqueous solutions of amphibilic polymers and their adsorbed state on Polystyrne latex dispersions by ultrasonic velocity measurements
[AD-A117416] N82-33538

CENTER FOR RENEWABLE RESOURCES, WASHINGTON, D.C.
Competition in the photovoltaics industry: A question of balance
[PB82-171570] N82-33886

CESSNA AIRCRAFT CO., VANDALIA, OHIO.
Impact of advanced propeller technology on aircraft/mission characteristics of several general aviation aircraft
[NASA-CR-167984] N82-33347

CHICAGO UNIV., ILL.
A theory of diagnostic interference. 1: Imagination and the psychophysics of evidence
[AD-A115940] N82-34026

CHRISTOPHER NEWPORT COLL., NEWPORT NEWS, VA.
Theoretical studies of radiation effects in composite materials for space use
[NASA-CR-3618] N82-34335

CINCINNATI UNIV., OHIO.
Structure and properties of polymers and organosilanes adsorbed onto oxidized aluminum and titanium
[AD-A117814] N82-33541

Constrained multibody system dynamics: An automated approach N82-33762

Inelastic strong interactions at high energies
[DE82-007984] N82-34215

CITY OF COLUMBIA, MO.
Development of a waste-to-energy plan: City of Columbia, Missouri
[DE82-009288] N82-33850

CIVIL AEROMEDICAL INST., OKLAHOMA CITY, OKLA.
Effects of prior physical exertion on tolerance to hypoxia, orthostatic stress, and physical fatigue
[AD-A114741] N82-34009

CLEMSON UNIV., S.C.
Hot tensile tests of Inconel 718
[NASA-CR-162089] N82-33496

CNR, INC., NEEDHAM, MASS.
Timing subsystem development
[AD-A117609] N82-33647

COAST GUARD RESEARCH AND DEVELOPMENT CENTER, GROTON, CONN.
A pilot study of human factors in SAR
[AD-A117917] N82-34087

Preliminary assessment of US Coast Guard Short Range Recovery (SRR) Forward Looking Infrared (FLIR) system small target detection performance
[AD-A117916] N82-34230

COASTAL ENGINEERING RESEARCH CENTER, FORT BELVOIR, VA.
Irregular wave runup on smooth slopes
[AD-A113648] N82-33975

COLLEGE OF WILLIAM AND MARY, NEWPORT NEWS, VA.
Broad band sound from wind turbine generators
[NASA-CR-165810] N82-34187
COLORADO STATE UNIV., FORT COLLINS.
Magnetic properties of lithium ferrite microwave materials
[AD-A116907] N82-34184
COLORADO UNIV., BOULDER.
San Juan Mountains avalanche study: Evaluation and prediction of avalanche hazard; meteorological and avalanche observations 1980-1981
[PB82-176967] N82-33966
Plasma wave turbulence and particle heating caused by electron beams, radiation and pinches
[AD-A117862] N82-34257
COLUMBIA UNIV., NEW YORK.
Multiphoton ionization and fragmentation pathways of polyatomic molecules: Studies with a laser time-of-flight mass spectrometer N82-33457
Research investigation directed toward extending the useful range of the electromagnetic spectrum
[AD-A117626] N82-33618
Magnetostratigraphy and magnetic properties of the Pliocene Glenns Ferry formation of southwest Idaho N82-33913
The marine geology of the Bahama Escarpment N82-33916
Geologic evolution of the Cordillera Darwin orogenic core complex, Southern Andes N82-33917
Multi-point Thomson scattering
[DE82-014385] N82-34270
COMMITTEE FOR HYDROLOGICAL RESEARCH TNO, THE HAGUE (NETHERLANDS).
Evaporation in Relation to Hydrology
[PB82-176108] N82-33814
COMMITTEE OF CONFERENCE (U. S. CONGRESS).
Making appropriations for the National Aeronautics and Space Administration
[H-REPT-97-897] N82-34308
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
Technology transfer in New Mexico
[GPO-85-343] N82-34309
COMMITTEE ON ENERGY AND COMMERCE (U. S. HOUSE).
Satellite communications/direct broadcast satellites
[GPO-90-289] N82-33412
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS (U. S. SENATE).
Acid rain
[GPO-87-365] N82-33889
COMMITTEE ON GOVERNMENT OPERATIONS (U. S. HOUSE).
International shortwave broadcasting and direct broadcast satellites: Voice of America, Radio Free Europe/Radio Liberty, Radio Marti
[H-REPT-97-398] N82-33595
COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
The need for a fifth Space Shuttle orbiter
[GPO-96-894] N82-33418
NASA authorization and NOAA LANDSAT authorization for 1983, volume 2
[GPO-93-418] N82-34306
COMPTROLLER GENERAL OF THE UNITED STATES, WASHINGTON, D.C.
Examination of the Federal Aviation Administration's plan for the National Airspace System
[AFMD-82-66] N82-33403
COMPUTER CORP. OF AMERICA, CAMBRIDGE, MASS.
An architecture for database management standards
[PB82-176322] N82-34099
COMPUTER SCIENCES CORP., BAY ST. LOUIS, MISS.
Feasibility study: Hollow plastic spheres to increase hydraulic fluid compressibility
[NASA-CR-169374] N82-33539
COMPUTER SCIENCES CORP., MOUNTAIN VIEW, CALIF.
Visual/motion cue mismatch during a coordinated roll maneuver N82-34055
CONCAWE, HAGUE (NETHERLANDS).
Sampling and measurement of particulate emissions from refinery installations
[PB82-174665] N82-33905
Sampling of liquid effluents from refineries
[PB82-174657] N82-33906
Guidelines for the determination of atmospheric conditions of oil mists
[PB82-174251] N82-33908
Exposure to atmospheric benzene vapour associated with motor gasoline
[PB82-174244] N82-34025
CONCORDIA UNIV., MONTREAL (QUEBEC).
Susceptibility of symmetric structures to nonlinear torsional coupling N82-33759
CONNECTICUT DEPT. OF TRANSPORTATION, WETHERSFIELD.
Placement of an experimental heater-scarified in-place recycled pavement
[PB82-197237] N82-33590
CONNECTICUT UNIV., STORRS.
Modeling lateral acceleration effects on pilot performance N82-34058
COPENHAGEN UNIV. (DENMARK).
Optimal staging of endoreversible heat engines
[DE82-900742] N82-33841
CORNELL UNIV., ITHACA, N. Y.
Diffraction and microscopy studies of the structure of grain boundaries in Fe, Fe-base alloys, and ceramic materials
[DE82-009553] N82-34287
CREUSOT-LOIRE, PARIS (FRANCE).
An example of the effect of hydrogen trapping on hydrogen embrittlement
[AD-A116299] N82-34106

D

DALHOUSIE UNIV., HALIFAX (NOVA SCOTIA).
Assessment and development of oculomotor flying skills by the application of the channel theory of vision
[AD-A115325] N82-34035
DARTMOUTH COLL., HANOVER, N.H.
A two-component rain model for the prediction of attenuation and diversity improvement
[NASA-CR-169198] N82-33592
DATA INFORMATION ASSOCIATES, ALBUQUERQUE, N. MEX.
A Toeplitz Gram-Schmidt algorithm for autoregressive modeling
[AD-A117071] N82-34145
DAYTON UNIV., OHIO.
Dayton aircraft cabin fire model, version 3. Volume 1: Physical description
[AD-A117905] N82-33361
Acetylene terminated sulfone resin development
[AD-A117243] N82-33531
A preliminary study of crack initiation and growth at stress concentration sites
[NASA-CR-169358] N82-33738
The roughness lengths associated with regions of heterogeneous vegetation and elevation
[AD-A117409] N82-33802
DE (SASADHAR), WEST BENGAL (INDIA).
Seismic waves N82-33563
DE SOTO, INC., DES PLAINES, ILL.
Waterborne polymeric films
[AD-A116857] N82-33532
DEFENSE MAPPING AGENCY AEROSPACE CENTER, ST. LOUIS, MO.
Measuring the fracture dimensions of empirical cartographic curves
[AD-A117498] N82-33804
DELAWARE UNIV., NEWARK.
Oceanic frontal stability: A numerical model
[AD-A115519] N82-33976
The inverse scattering problem for acoustic waves
[AD-A117048] N82-34193
DELTA INFORMATION SYSTEMS, INC., JENKINTOWN, PA.
Graphic/symbol segmentation for Group 4 facsimile systems
[AD-A117026] N82-33684
DEPARTMENT OF ENERGY, PITTSBURGH, PA.
Hydroprocessing of solvent-refined coal: Catalyst-screening results
[DE82-009568] N82-33479
Apparatus development for measuring heat flux in a direct coal-liquefaction preheater
[DE82-012013] N82-33692
DEPARTMENT OF ENERGY, WASHINGTON, D. C.
International Energy Agency instrumented facilities survey for solar assisted low energy dwellings
[DE82-015158] N82-33865
The 1981 magnetic-fusion theory program project summaries
[DE82-008102] N82-34260
Tokamak confinement experiments
[DE82-009301] N82-34265
DESMATICS, INC., STATE COLLEGE, PA.
Research on the development of a statistical impact acceleration injury prediction model from -G(x) accelerator runs
[AD-A116440] N82-34003
Interruptible supersaturated two-level designs
[AD-A115786] N82-34181
DETROIT DIESEL ALLISON, INDIANAPOLIS, IND.
Separated diffuser flow analysis, volume 1
[AD-A117668] N82-33669
DOUGLAS AIRCRAFT CO., INC., LONG BEACH, CALIF.
Advanced turboprop testbed systems study
[NASA-CR-167895] N82-33375
Design methodology for bonded-bolted composite joints. Volume 1: Analysis derivations and illustrative solutions
[AD-A117342] N82-33713
DOUGLAS AIRCRAFT CO., INC., ST. LOUIS, MO.
A model-based technique for predicting pilot opinion ratings for large commercial transports N82-34050
DRAPER (CHARLES STARK) LAB., INC., CAMBRIDGE, MASS.
Ultimate intrinsic coercivity samarian-cobalt magnet. An Earth based feasibility study for Space Shuttle missions
[NASA-CR-170627] N82-33495
DREXEL UNIV., PHILADELPHIA, PA.
Fracture mechanics of delamination: Initiation and growth
[AD-A115728] N82-33438
DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
Loading and unloading resin from MPPF rapid ion exchange columns
[DP-1609] N82-33458
DUKE UNIV., DURHAM, N. C.
An emulator for minimizing finite element analysis implementation resources N82-33751
Performance bounds for binary testing with arbitrary weights
[AD-A117493] N82-34154
DYNAMIC CONTROLS, INC., DAYTON, OHIO.
Flight tests of a GE and DCI direct drive fly by wire flight control system
[AD-A117244] N82-33401
DYNAMICS TECHNOLOGY, INC., TORRANCE, CALIF.
Design and laboratory testing of a prototype linear temperature sensor
[AD-A117245] N82-33688

E

EAGLE-PICHER INDUSTRIES, INC., JOPLIN, MO.
Calcium inorganic electrolyte battery development
[AD-A115956] N82-33831
Nickel-zinc batteries for RPV applications
[AD-A115843] N82-33832
ECOLE NATIONALE SUPERIEURE DE L'AERONAUTIQUE ET DE L'ESPACE, TOULOUSE (FRANCE).
Application of a boundary element method to the study of dynamical torsion of beams N82-33747
ECONOMIC RESEARCH SERVICE, WASHINGTON, D. C.
Solar- and wind-powered irrigation systems
[PB82-177486] N82-33887
EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Effect of simulated medium-Btu coal-gasifier atmospheres on the biaxial stress-rupture behavior of four candidate coal-gasifier alloys
[DE82-010614] N82-33507
Design and evaluation of a pressure sensor for high temperature nuclear application
[EGG-2135] N82-33682
Design of the Glenwood Springs downhole heat exchanger
[DE82-013809] N82-33855
Geothermal conversion at Veterans Hospital, Boise, Idaho
[DE82-012198] N82-33856
EIC, INC., NEWTON, MASS.
Development of host crystals for Ce(+3) blue and blue-green solid-state lasers
[AD-A117899] N82-33710
Preparation and characterization of amorphous ZnAs for use in solar cells
[DE82-014516] N82-33867
EIDGENOESSISCHE ANSTALT FUER DAS FORSTLICHE VERSUCHSWESEN, BIRMENSDORF (SWITZERLAND).
Development of nitrogen sensor for determination of PN(2) in body tissues
[AD-A116607] N82-34005
ELECTRIC POWER RESEARCH INST., PALO ALTO, CALIF.
Solar-heating and -cooling research projects: A summary
[DE82-903152] N82-33864
ELECTRICITY COUNCIL RESEARCH CENTRE, CAPENHURST (ENGLAND).
Some practical aspects on the infra-red thermography of buildings
[PB82-174517] N82-33576
EMBRY-RIDDLE AERONAUTICAL INST., DAYTONA BEACH, FLA.
The effects of pilot experience of acquiring instrument flight skills, phase 2
[AD-A113576] N82-34033

ENGINEERING-SCIENCE, INC., ARCADIA, CALIF.
Vapor condensation control of JP-4 emissions from underground storage tanks at March Air Force Base, California
[AD-A117875] N82-33554

ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
Conversion of ammonia plants to methanol production
[PB82-177494] N82-33489
Exxon donor solvent coal liquefaction process
[PB82-177460] N82-33490
The H-coal and SRC-2 processes
[PB82-173998] N82-33491

ENVIRONMENTAL PROTECTION AGENCY, DENVER, COLO.
Air quality trends in Region 8, 1980 data
[PB82-204074] N82-33910

ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., LEXINGTON, MASS.
A two-component rain model for the prediction of attenuation and diversity improvement
[NASA-CR-169198] N82-33592

ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Cartographic mapping study
[NASA-CR-170446] N82-33795

ENVIRONMENTAL SCIENCE AND ENGINEERING, INC., GAINESVILLE, FLA.
Research and development services: Methods development
[AD-A117643] N82-34302

EPSILON LABS., BEDFORD, MASS.
Multichannel VUV rocketborne monochromator for low-level auroral measurements
[AD-A115815] N82-34220

F

FACILITY CHECKING SQUADRON (1866TH) (AFCS), SCOTT AFB, ILL.
TRACALS evaluation report. Special report: A procedure for RTT position improvement using linear regression analysis of glide slope structure
[AD-A115926] N82-33365

FAILURE ANALYSIS ASSOCIATES, PALO ALTO, CALIF.
Probabilistic environmental model for solid rocket motor life prediction
[AD-A117651] N82-33427

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
Examination of aircraft interior emergency lighting in a postcrash fire environment
[AD-A117629] N82-33360
Northeast corridor helicopter area navigation accuracy evaluation
[AD-A117445] N82-33367
Improving conflict alert performance using moving target detector data
[AD-A117691] N82-33370
Memory and computational requirements for tracking in the advanced computer system
[AD-A117666] N82-33619

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
Effectiveness of the Civil Aviation Security program
[AD-A117671] N82-33362
Study of the frequency assignment congestion in the ultra high frequency air traffic control air/ground communication band
[AD-A117640] N82-33368
Preliminary analysis of the benefits and costs to implement the National Airspace System Plan
[AD-A117664] N82-33369
FAA air traffic activity, FY 1981
[PB82-200361] N82-33371
Evaluation of four-color plan view display console
[AD-A117897] N82-34085

FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
United Computing Systems, Inc. CYBER 730, CDC COBOL 5.3 Level 528
[PB82-169509] N82-34100
International Business Machines Corporation, IBM Series/1 COBOL 5719-CB7 version 2 Level 0 (COBOL technical report)
[PB82-155342] N82-34120
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEP, PRPQ P82648 Version 2 Level 0 (validation summary report)
[PB82-155359] N82-34121
International Business Machines Corporation, IBM Series/1 COBOL 5719-CB7 version 2 level 0 (validation summary report)
[PB82-155367] N82-34122
International Business Machines Corporation, IBM Series/1 COBOL (EDX)5719-CB5 version 2 level 0 (validation summary report)
[PB82-155375] N82-34123
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEL, PRPQ P82647 version 2 level 0 (COBOL technical report)
[PB82-155383] N82-34124
International Business Machines Corporation, IBM Series/1 Host COBOL 5799 TEL, PRPQ P82647 version 2 level 0 (validation summary report)
[PB82-155391] N82-34125

FEDERAL HIGHWAY ADMINISTRATION, SACRAMENTO, CALIF.
Proof testing of a structural plate pipe with varying bedding and backfill parameters. Section 7, volume 1: Finite element analysis program modification and analysis of zone 2
[PB82-201526] N82-33587

FERMI NATIONAL ACCELERATOR LAB., BATAVIA, ILL.
Versatile secondary beam for the meson area
[DE82-014275] N82-34209

FLIGHT SAFETY FOUNDATION, INC., ARLINGTON, VA.
A safety appraisal of the air traffic control system
[AD-A115743] N82-33366

FLORIDA STATE UNIV., TALLAHASSEE.
Central limit theorems in the area of large deviations for some dependent random variables
[AD-A117714] N82-34155
Ranking and subset selection procedures for exponential populations with Type-1 and Type-2 censored data
[AD-A115821] N82-34161

FLORIDA UNIV., GAINESVILLE.
Coastal construction practices
[PB82-201062] N82-33591
Responses of FM/CW systems having filters
[AD-A117371] N82-33617
Production lot sizing and the power of 2
[AD-A116929] N82-34292

FLOW ANALYSIS ASSOCIATES, ITHACA, N.Y.
A theoretical appraisal of the joint effects of turbulence and of Langmuir circulations on the dispersion of oil spilled in the sea
[AD-A117844] N82-33894

FONDAZIONE UGO BORDONI, ROME (ITALY).
A note on COPE: A software tool for modeling and evaluating the performance of computing systems
[FUB-7-1982] N82-34119

FORSCHUNGINSTITUT FUER ANTHROPOTECHNIK, WACHTBERG (WEST GERMANY).
Analysis of driver performance under reduced visibility
N82-34075

FOUNDATION SCIENCES, INC., PORTLAND, OREG.
Field and in-situ rock-mechanics testing manual
[DE82-015762] N82-33940

FRANKLIN RESEARCH CENTER, ELVERSON, PA.
TMA chemical release payloads for stratospheric wind measurements auroral E program and related programs
[AD-A115832] N82-33921

FRANKLIN RESEARCH CENTER, PHILADELPHIA, PA.
Energy-conserving passive solar multi-family retrofit projects. Cycle 5, category 1: HUD Solar Heating and Cooling Demonstration Program
[PB82-180944] N82-33880

FUEL AND ENERGY CONSULTANTS, INC., NEW YORK, N.Y.
Assessment of energy saving technologies with potential for applications in US industries
[DE82-012571] N82-33874

FWG ASSOCIATES, INC., TULLAHOMA, TENN.
Analysis of a kite anemometer
[DE82-009058] N82-33691
Guidelines for siting WECS relative to small-scale terrain features
[DE82-009124] N82-33847

G

GARRETT TURBINE ENGINE CO., PHOENIX, ARIZ.
Ceramic gas turbine engine demonstration program
[AD-A117088] N82-33395

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
Aircraft thrust/power management can save defense fuel, reduce engine maintenance costs and improve readiness
[AD-A117935] N82-34296
Analysis of NASA's fiscal year 1983 budget request for research and development to determine the amount that supports DOD's programs
[B-207165] N82-34307
Major science and technology issues
[PAD-81-35] N82-34310

GENERAL ATOMIC CO., SAN DIEGO, CALIF.
Thermochemical water-splitting for hydrogen production
[PB82-206174] N82-33560
Fusion engineering device. Volume 1: Mission and program summary
[DE82-008931] N82-34267
Fusion engineering device. Volume 3: Test plan
[DE82-008933] N82-34274
Fusion engineering device. Volume 4: Physics basis and physics R and D requirements
[DE82-008934] N82-34275
Fusion engineering device. Volume 5: Technology R and D requirements for construction
[DE82-008936] N82-34276

GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
Development of tough, moisture resistant laminating resins
[NASA-CR-3615] N82-33432

GENERAL ELECTRIC CO., BINGHAMTON, N.Y.
Non-complex item development specification for a feasibility model of an electronic master monitor and advisory display system (EMMADS)
[AD-A117919] N82-33386
Motor technology for electric Remotely Piloted Vehicle (RPV)
[AD-A117732] N82-33651

GENERAL ELECTRIC CO., CINCINNATI, OHIO.
The CF6 jet engine performance improvement: Low pressure turbine active clearance control
[NASA-CR-165557] N82-33393

GENERAL ELECTRIC CO., LANHAM, MD.
Interactive digital image processing for terrain data extraction
[AD-A116881] N82-34107

GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Design concepts and cost studies for magnetic suspension and balance systems
[NASA-CR-165917] N82-33404
Significant parameters in the catalyzed CO2 gasification of coal chars
[DE82-008508] N82-33480
Long-term materials test program: Materials exposure test plan
[DE82-013322] N82-33516
A novel boundary element method program for heat transfer analysis of composite materials N82-33748

GENERAL ELECTRIC CO., SYRACUSE, N.Y.
Glass-to-metal seal quality
[AD-A117598] N82-33718

GEO-CENTERS, INC., NEWTON, MASS.
The effect of carbon and boron on the friction behavior of Ti-implanted 52100 bearing steel at low sliding speeds
[AD-A117742] N82-33500
Compatibility of polyacetylene with lithium battery materials
[AD-A117684] N82-33837

GEOLOGICAL SURVEY, BATON ROUGE, LA.
Water resources data for Louisiana, water year 1981. Volume 3: Coastal Louisiana
[PB82-188202] N82-33821

GEOLOGICAL SURVEY, HARRISBURG, PA.
Water resources data for Pennsylvania, water year 1980. Volume 1: Delaware River Basin
[PB82-190372] N82-33819

GEOLOGICAL SURVEY, LITTLE ROCK, ARK.
Water resources data for Arkansas, water year 1980
[PB82-190380] N82-33818

GEOLOGICAL SURVEY, MENLO PARK, CALIF.
Description of a magnetic tape containing the principal facts of approximately 64000 gravity stations in the State of California
[PB82-168279] N82-33943

GEOLOGICAL SURVEY, PORTLAND, OREG.
Water resources data for Oregon, water year 1980. Volume 2: Western Oregon
[PB82-190364] N82-33820

GEOLOGICAL SURVEY, TALLAHASSEE, FLA.
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813

GEORGE WASHINGTON UNIV., WASHINGTON, D.C.
Information display systems. Summary of project status
[DE82-009971] N82-34304

GEORGETOWN UNIV., WASHINGTON, D.C.
An analytical solution to the problems of 3-phonon interaction and second harmonic generation in a solid plate
[AD-A117907] N82-34195

GEORGIA INST. OF TECH., ATLANTA.
Interaction of oscillations of channel flow and flow separation at duct discontinuities
[AD-A116801] N82-33666

Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-3619] N82-33734

A computer simulation approach to measurement of human control strategy N82-34046

The Georgia Institute of Technology research program in fully distributed processing systems
[AD-A116955] N82-34089

An O(NlogN) planar travelling salesman heuristic based on spacefilling curves
[AD-A115357] N82-34136

Growth and Characterization of In(1-x)Ga(x) As(y)P(1-y) and GaAs using molecular beam epitaxy
[AD-A117507] N82-34282

Light scattering calculations for the nephelometer experiment on the 1981/1982 Jupiter Orbiter-Probe mission
[NASA-CR-169418] N82-34323

GEORGIA UNIV., ATHENS.
High energy hadron-hadron collisions
[DE82-011255] N82-34206

GOULD, INC., ROLLING MEADOWS, ILL.
Study of the fundamental thermal-management aspects of the lithium-aluminium/iron sulfide battery
[DE82-014441] N82-33871

GRACE (W. R.) AND CO., DALLAS, TEX.
Feasibility study for a coal-sourced methanol project
[DE82-008137] N82-33559

GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Preliminary design and economic investigations of Diffuser Augmented Wind Turbines (DAWT)
[DE82-008475] N82-33854

Design, simulation and evaluation of advanced display concepts for the F-16 control configured vehicle
N82-34062

GTE SYLVANIA, INC., NEEDHAM HEIGHTS, MASS.
HF wideband modem
[AD-A116859] N82-33603

H

HAMMOND (KATHERINE A. GREEN), HOUSTON, TEX.
Environmental aspects of potential petroleum exploration and exploitation in Antarctica: Forecasting and evaluating risks
[PB82-169772] N82-33907

HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Effect of specimen size on the fracture toughness of Type 304 stainless steel
[DE82-012517] N82-33517

HARRY DIAMOND LABS., ADELPHI, MD.
Design of microstrip linear array antennas by computer
[AD-A117399] N82-33620

Near millimeter wave radiation from a gyromonotron
[AD-A117301] N82-33703

Charge penetration effects in rare-earth crystal fields
[AD-A117494] N82-34283

HAWAII UNIV., HONOLULU.
Five OTEC biofouling and corrosion experiments at Keahole Point, 1976 to 1980
[DE82-008086] N82-33987

HONEYWELL CORPORATE TECHNOLOGY CENTER, BLOOMINGTON, MINN.
Electron beam generated holographic optical element research
[AD-A117052] N82-33685

HOUSTON UNIV., TEX.
A finite element approach for shells of revolution with a local deviation N82-33756

HOWARD UNIV., WASHINGTON, D. C.
The dynamics and control of large flexible space structures-V
[NASA-CR-169360] N82-33423

HUGHES AIRCRAFT CO., CULVER CITY, CALIF.
Application of In Situ Fiberization for fabrication of improved strain isolation pads and graphite epoxy composites
[NASA-CR-3616] N82-33431

HUGHES HELICOPTERS, CULVER CITY, CALIF.
Development of effective machining and tooling techniques for Kevlar composite laminates
[AD-A117853] N82-33716

HUYGENS LABORATIUM, LEIDEN (NETHERLANDS).
Identification of the emission features near 3.5 microns in the pre main sequence star HD 97048
[NASA-CR-169379] N82-34320

I

ILLINOIS INST. OF TECH., CHICAGO.
Selective metal-ion extraction for multiple-ion liquid-liquid exchange reactions
[DE82-011721] N82-33474

ILLINOIS UNIV., CHAMPAIGN.
Category and word search: Generalizing search principles to complex processing
[AD-A115130] N82-34301

ILLINOIS UNIV., CHICAGO.
Modeling of human operator dynamics in simple manual control utilizing time series analysis N82-34038

ILLINOIS UNIV., URBANA.
A FORTRAN program for rectangular microstrip antennas
[AD-A116952] N82-33612

An analytical investigation of fin lines with magnetized ferrite substrate
[AD-A117504] N82-33624

The effect of stimulus-central processing-response compatibility and resource competition on pilot performance
[AD-A113754] N82-34032

ILLINOIS UNIV., URBANA-CHAMPAIGN.
High pressure NMR studies of the dynamic structure of liquids N82-33450

Microwave spectroscopy of weakly bound molecular complexes N82-33451

Raman studies of reorientational and vibrational relaxation in dense fluids N82-33456

Applicability of factor analysis to the determination of mineral matter in coal N82-33790

INDIANA UNIV., BLOOMINGTON.
Metal alkoxides: Models for metal oxides
[AD-A117947] N82-33503

INSTITUT FRANCO-ALLEMAND DE RECHERCHES, ST. LOUIS (FRANCE).
Study of the source function by the causality methods defined by Ribner and Siddon
[PB82-205170] N82-34196

INSTITUTE FOR PERCEPTION RVO-TNO, SOESTERBERG (NETHERLANDS).
Levels of steering control: Reproduction of steering-wheel movements N82-34071

INSTITUTE OF ECOLOGY, INDIANAPOLIS, IND.
Prospective significance of temperate-zone carbon pool transients, 1980 - 2010
[DE82-011866] N82-33896

INSTITUTE OF GEOLOGICAL SCIENCES, EDINBURGH (SCOTLAND).
World mineral statistics 1975-79: Production, exports, imports
[PB82-172842] N82-33811

Overseas Geology and Mineral Resources, number 55. Outline of the geology of Ecuador
[PB82-172784] N82-33815

Overseas Geology and Mineral Resources, number 58. An annotated bibliography of Ecuadorian geology
[PB82-172768] N82-33816

United Kingdom mineral statistics 1980
[PB82-172362] N82-33817

INSTITUTE OF OCEANOGRAPHIC SCIENCES, BIRKENHEAD (ENGLAND).
High precision tidal gravity
[AD-A116941] N82-33934

INSTITUTE OF PUBLIC ADMINISTRATION, WASHINGTON, D.C.
An assessment of the field status of active solar systems
[DE82-011939] N82-33845

Assessment of the field status of active solar systems. Volume 2: Appendices
[DE82-016032] N82-33878

INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Evaluation of spatial filtering on the accuracy of wheat area estimate
[E82-10292] N82-33792

The use of LANDSAT data to monitor the urban growth of Sao Paulo Metropolitan area
[E82-10294] N82-33793

Study of atmospheric diffusion using LANDSAT
[NASA-CR-169325] N82-33794

INTERA ENVIRONMENTAL CONSULTANTS LTD., OTTAWA (ONTARIO).
Analysis of remote sensing data collected for detection and mapping of oil spills: Reduction and analysis of multi-sensor airborne data of the NASA Wallops oil spill exercise of November 1978
[NASA-CR-165886] N82-33891

IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
Algebraic tests for functional controllability of functional differential equation systems
[AD-A117032] N82-34149

IOWA UNIV., IOWA CITY.
Study of periodic turbulent pipe flow
[PB82-201534] N82-33680

Detection of nonthermal continuum radiation in Saturn's magnetosphere
[NASA-CR-169231] N82-34326

ITEK CORP., LEXINGTON, MASS.
Feasibility evaluation and study of adapting the attitude reference system to the Orbiter camera payload system's large format camera
[NASA-CR-167629] N82-33420

ITT AEROSPACE/OPTICAL DIV., FORT WAYNE, IND.
Intagliated phosphor screen image tube project
[NASA-CR-170445] N82-33635

ITT ELECTRO-OPTICAL PRODUCTS DIV., ROANOKE, VA.
Optical rotary joint
[AD-A117025] N82-34226

J

JAYCOR, ALEXANDRIA, VA.
Elliptic equation solvers for NORDA ocean models and a study of equatorial ocean dynamics
[AD-A117374] N82-33977

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
Low noise lead screw positioner
[NASA-CASE-NPO-15617-1] N82-33681

An emulator for minimizing finite element analysis implementation resources N82-33751

Experimental evaluation of the concept of supervisory manipulation N82-34073

Evaluation of SMART sensor displays for multidimensional precision control of Space Shuttle remote manipulator N82-34074

A bibliography of planetary geology principal investigators and their associates, 1981 - 1982
[NASA-CR-3593] N82-34313

JOHN CARROLL UNIV., CLEVELAND, OHIO.
Studies of the propagation of elastic waves in fluids and solids
[AD-A117270] N82-33616

JOHNS HOPKINS UNIV., BALTIMORE, MD.
Interpretation of the Earth's gravity field N82-33911

Structural geometry of the Snake River Range, Idaho and Wyoming N82-33912

The comparative sedimentology of the Bahama type shelf carbonates of the middle Ordovician St. Paul group of the central Appalachians N82-33915

Experimental analysis of team performance: Methodological developments and research results
[AD-A116915] N82-34034

JOINT INST. FOR LAB. ASTROPHYSICS, BOULDER, COLO.
Evidence for extended chromospheres surrounding red giant stars
[NASA-CR-169349] N82-34316

Ultraviolet and X-ray detection of the 56 Peg system (KO 2p + WD)
[NASA-CR-169351] N82-34317

The structure, energy balance, and winds of cool stars
[NASA-CR-169356] N82-34318

JOINT INST. FOR NUCLEAR RESEARCH, DUBNA (USSR).
Inelastic interactions of 4.5 GeV/c protons with emulsion nuclei not accompanied by relativistic charged particles
[DE82-701020] N82-34207

JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
USSR Report: Life sciences. Biomedical and behavioral sciences
[JPRS-81775] N82-33988

New data on metabolism and action mechanism of mycotoxins N82-33989

Design of automated systems for control of technological processes in large scale microbiological industry with use of microprocesors N82-33990

Bioelectric fields: Their sources, nature and purpose N82-33991

Effect of local vibration on divers working under water N82-33992

Structural changes in plasma membrane under influence of ionizing radiation N82-33993

Effects of combination of antibiotic-resistant bifidobacteria and corresponding antibiotics of survival of irradiated mice N82-33994

K

KENTRON INTERNATIONAL, INC., HAMPTON, VA.
Design concepts and cost studies for magnetic suspension and balance systems
[NASA-CR-165917] N82-33404

KENTUCKY UNIV., LEXINGTON.
Dynamic response of vertebral elements response of the intervertebral joint to torsion
[AD-A115125] N82-34016

KERNFORSCHUNGSZENTRUM, KARLSRUHE (WEST GERMANY).
Velocity and temperature profiles in rough annuli
[DE82-780258] N82-33672

KINETICS TECHNOLOGY INTERNATIONAL CORP., PASADENA, CALIF.
Assessment of a coal-gasification fuel-cell system for utility application
[DE82-903667] N82-33870

KLEINFELDER (J. H.) AND ASSOCIATES, WALNUT CREEK, CALIF.
Evaluation of techniques for predicting soil liquefaction and verification of field techniques to predict in situ shear wave velocity
[PB82-168444] N82-33581

KOREA ADVANCED ENERGY RESEARCH INST., SEOUL.
Development of nondestructive testing technique. Ultrasonic testing and radiographic testing
[DE82-700448] N82-33726

L

LA JOLLA INST., CALIF.
Path integral formation of wave propagation in the ionosphere, 4
[AD-A117723] N82-33628

LEEDS AND NORTHRUP CO., NORTH WALES, PA.
Particulate-analysis instrumentation for systems
[DE82-012464] N82-33693

LENOX INST. FOR RESEARCH, INC., MASS.
Electrical energy consumption and heating requirements of municipal wastewater treatment plants
[PB82-183393] N82-33882
Symposium on Environmental Technology and Management
[PB82-185273] N82-33902

LETTERMAN ARMY INST. OF RESEARCH, SAN FRANCISCO, CALIF.
Comparison of rhesus and human spectral dynamic visual acuity
[AD-A115258] N82-34018

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
MSTRIP2: Parameters of microstrip transmission lines and of coupled pairs of lines. 1978 version and its application
[AD-A117364] N82-33615
Data report for the Northwest Residential Experiment Station, December 1981
[DE82-016027] N82-33868
A functional model for the closely spaced object resolution process
[AD-A116890] N82-34150
Equatorial motion about an oblate primary
[AD-A117641] N82-34324

LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.
Stand-alone ignition devices
[PB82-180662] N82-33488
Residual energy application program: Utilization of high-temperature waste heat by means of Rankine-cycle engines. A technical summary
[DE82-010376] N82-33839
Supercritical carbon dioxide regeneration of activated carbon loaded with contaminants from Rocky Mountain Arsenal well water
[AD-A116842] N82-33893

LIVERPOOL UNIV. (ENGLAND).
Recent progress in the dynamic plastic behavior of structures, part 3 N82-33728

LOCKHEED AIRCRAFT CORP., BURBANK, CALIF.
Aircraft alerting systems standardization study. Phase 4: Accident implications on systems design
[AD-A117876] N82-33388

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Study of laser heated propulsion devices. Part 1: Evaluation of laser devices, fuels and energy coupling mechanisms
[NASA-CR-170625] N82-33696
Study of laser heated propulsion devices. Part 2: Assessment of laser propulsion modeling and simulation requirements
[NASA-CR-170626] N82-33697

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
A semi-implicit dynamic relaxation algorithm for static nonlinear structural analysis N82-33740

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Superconducting Magnetic Energy Storage (SMES) Program
[DE82-009083] N82-33848
Hot-dry-rock geothermal resource 1980
[DE82-015082] N82-33863
Calculations of increased solar UV fluxes and DUV doses due to stratospheric-ozone depletions
[DE82-009996] N82-33899
Systems performance measurement and analysis
[DE82-009067] N82-34126
Accurate monotonicity-preserving cubic interpolation
[DE82-009964] N82-34157
Importance of elastic scattering to particle direction determination in Monte Carlo calculations of DT reactions in flight
[DE82-015080] N82-34210
Model calculations for the explosive generator-driven dense plasma focus
[DE82-008960] N82-34264
Simplified scaling model for the THETA-pinch
[DE82-009962] N82-34273

LOUISIANA STATE UNIV., BATON ROUGE.
Inter-subband optical absorption in an inverse layer on a semiconductor surface in tilted magnetic fields
[DE82-011591] N82-34185

LOVELACE BIOMEDICAL AND ENVIRONMENTAL RESEARCH INST., ALBUQUERQUE, N. MEX.
Potential health and environmental effects of the fluidized-bed combustion of coal
[DE82-014389] N82-33900
Potential health and environmental effects of light-duty diesel vehicles, 2
[DE82-014390] N82-33901

LOVELACE FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH, ALBUQUERQUE, N. MEX.
Oxygen transport to human tissues
[AD-A115904] N82-34007

M

M/A-COM LINKABIT, INC., SAN DIEGO, CALIF.
Earth station interface for demand assignment applications
[AD-A117721] N82-33627

MARQUETTE UNIV., MILWAUKEE, WIS.
The effect of disuse on fast and slow skeletal muscle N82-33997

MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 1: Study results
[NASA-CR-165975] N82-34129
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation, volume 2, part 1. Appendix A: Software documentation
[NASA-CR-165976] N82-34130
Evaluation of automated decisionmaking methodologies and development of an integrated robotic system simulation. Volume 2, Part 2: Appendixes B, C, D and E
[NASA-CR-165977] N82-34131

MARTIN MARIETTA AEROSPACE, ORLANDO, FLA.
Automatic test methods for linear microcircuits
[AD-A117594] N82-33649

MARYLAND UNIV., COLLEGE PARK.
Experimental and theoretical investigation of microwave and millimeter wave radiation from hollow, rotating, electron beams
[AD-A117896] N82-33625
A mixed formulation finite element for linear thin shell analysis N82-33753
Cellular architectures for pattern recognition
[AD-A117049] N82-34110
Vortex shedding from cylinders and the resulting unsteady forces and flow phenomenon, part 1 N82-34338

MARYLAND UNIV., PRINCESS ANNE.
Two dimensional viscous flow of a compressible fluid
[AD-A116913] N82-33667

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Rapid quenching effects in PVC films
[NASA-CR-169350] N82-33524
Finite element modeling of nonisothermal polymer flows
[NASA-CR-169355] N82-33525
Effect of ground terrain on millimeter wave propagation
[AD-A116837] N82-33614
Some vibrating membrane equations for the linear estimation of two dimensional isotropic random fields
[AD-A116959] N82-33770
Homeostatic control: Economic integration of solar technologies into electric power operations and planning
[DE82-013631] N82-33859
Residential photovoltaic worth: A summary assessment of the MIT energy laboratory
[DE82-010867] N82-33866
Energy laboratory data and model directory
[PB82-180274] N82-33884
Estimates of crustal transmission losses using MLM array processing
[AD-A117278] N82-33929
Zero-crossings and spatiotemporal interpolation in vision: Aliasing and electrical coupling between sensors
[AD-A117608] N82-34019
Subjective scaling of mental workload in a multi-task environment N82-34048
Data flow computer architecture
[DE82-014632] N82-34098
Virtual information facility of the INFOPLEX software test vehicle, part 1
[AD-A116502] N82-34104
Virtual information facility of the INFOPLEX software test vehicle, part 2
[AD-A116503] N82-34105
Computer graphic representation of remote environment using position tactile sensors
[AD-A116912] N82-34111
Nonalgebraic symbol manipulators for use in scientific and engineering modeling: Introducing the FORSE (FORTRAN Symbol Expander)
[DE82-009818] N82-34118
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 1: Executive summary
[NASA-CR-162079] N82-34127
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 3: ARAMIS overview
[NASA-CR-162081] N82-34128
Distributed minimum hop algorithms
[AD-A117808] N82-34151
Stochastic and adaptive systems
[AD-A117029] N82-34182
Suppression of plasma formation in waveguide antennas for lower-hybrid heating
[DE82-014392] N82-34269

MATERIALS RESEARCH LABS., ASCOT VALE (AUSTRALIA).
Explosives instrumentation group trial 6/77-propellant fire trials (series 2)
[AD-A117695] N82-33555
A system for computer-aided design of printed circuit boards
[AD-A117696] N82-33653

MCDONNELL-DOUGLAS CORP., ST. LOUIS, MO.
Aircraft alerting systems standardization study. Phase 4: Accident implications on systems design
[AD-A117876] N82-33388

MCDONNELL-DOUGLAS RESEARCH LABS., ST. LOUIS, MO.
Short-pulse electron-beam propagation experiments in a controlled-environment chamber
[AD-A116999] N82-34212

MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
Automotive Stirling Engine Mod 1 Design Review, volume 1
[NASA-CR-167935] N82-34311
Automotive Stirling Engine Mod 1 Design Review, volume 3
[NASA-CR-167397] N82-34312

METROPOLITAN DADE COUNTY PLANNING DEPT., MIAMI, FLA.
Effects of land use on surface-water quality in the East Everglades, Dade County, Florida
[PB82-176520] N82-33813

MIAMI UNIV., FLA.
The interaction of manganese(II) with the surface of calcite in dilute solutions and seawater
[DE82-011104] N82-33475

MICHIGAN STATE UNIV., EAST LANSING.
Determination of carbon monoxide in air by triple quadrupole mass spectrometry
[AD-A117443] N82-33470
Adaptive sampling for enhanced performance of an ion detection system for a triple quadupole mass spectrometer
[AD-A117441] N82-33471
Studies on age-hardening in spinodally modulated alloys, experimental and theoretical
[DE82-007957] N82-33506
Structures and fragmentation mechanics of the ions of ethanol by triple quadrupole mass spectrometry
[AD-A117442] N82-34200

MICHIGAN TECHNOLOGICAL UNIV., HOUGHTON.
System optimization by periodic control
[AD-A117815] N82-33402
MICHIGAN UNIV., ANN ARBOR.
Voltammetric studies of a multipurpose membrane electrode N82-33455
White light optical processing and holography
[AD-A117506] N82-33689
Vectorized sparse elimination
[AD-A117112] N82-34094
MID-AMERICAN SOLAR ENERGY COMPLEX, MINNEAPOLIS, MINN.
Home retrofitting for energy conservation and solar considerations
[DE82-013420] N82-33860
MIDDLEBURY COLL., VT.
Structure of field rotating disturbances in warm plasma
[NASA-CR-169359] N82-34256
MIDWEST RESEARCH INST., GOLDEN, COLO.
Progress in the entrained-flow, fast-ablative pyrolysis of biomass
[DE82-009911] N82-33478
The application of US upper-wind data in one design of tethered wind energy systems
[DE82-012880] N82-33962
MINNESOTA UNIV., MINNEAPOLIS.
Acoustic strain visualization in structural materials
[AD-A116992] N82-33771
Nearly on line scheduling of multiprocessor systems with memories
[AD-A116823] N82-34090
MINNESOTA UNIV., ST. PAUL.
The examination of electrical-breakdown properties of insulating gases used in electrostatic accelerators
[DE82-009106] N82-33654
MISSISSIPPI STATE UNIV., STATE COLLEGE.
Analysis of space telescope data collection system
[NASA-CR-162090] N82-34322
MISSOURI UNIV., COLUMBIA.
Active microwave remote sensing research program plan. Recommendations of the Earth Resources Synthetic Aperture Radar Task Force
[NASA-CR-167726] N82-33596
MISSOURI UNIV., ROLLA.
Research support for plasma diagnostics on Elmo Bumpy diamagnetic measurements for the electron rings and development of a ferromagnetic resonance magnetometer
[DE82-007245] N82-34259
MITRE CORP., BEDFORD, MASS.
Analysis of interactive graphics display equipment for an automated photo interpretation system
[AD-A117647] N82-34115
MOLUSIS (JOHN A.), ASHFORD, CONN.
Rotorcraft blade mode damping identification from random responses using a recursive maximum likelihood algorithm
[NASA-CR-3600] N82-33373
MONTANA ENERGY AND MHB RESEARCH AND DEVELOPMENT INST., INC., BUTTE.
The Montana Energy and MHD Development Institute, Inc.
[PB82-176926] N82-33885

N

NAGOYA UNIV. (JAPAN).
Desorption and related phenomena relevant to fusion devices
[IPPJ-AM-22] N82-34234
An analysis of current drive by travelling wave based on theory of intrinsic stochasticity
[IPPJ-575] N82-34235
Determination of metastable fraction in an ion beam extracted from ECR plasma
[IPPJ-580] N82-34236
Formation of relativistic electron beam rings in a conducting cavity
[IPPJ-583] N82-34237
Formation of magnetic islands and ergodic magnetic layers in wall-lapping plasma as a non-divertor concept for a reactor-relevant Tokamak
[IPPJ-587] N82-34238
Probe measurements for impurity transport in the scrape-off layer of JIPP T-II
[IPPJ-590] N82-34239
Simple method of sheet plasma production for high current negative ion II (curved sheet plasma)
[IPPJ-597] N82-34240
All coated limited experiment in the JIPP T-II Tokamak
[IPPJ-593] N82-34241
Wall material characteristics in reacting plasma modelling
[IPPJ-592] N82-34242
Helical magnetic configurations produced with the help of ferromagnetic materials. 2: The Helimag
[IPPJ-591] N82-34243
Lax-pair operators for squared eigenfunctions in the inverse scattering transformations
[IPPJ-589] N82-34244
Self-consistent analysis of collisional loss in a spatially varying magnetic mirror
[IPPJ-588] N82-34245
Wall conditioning of the JIPP T-II Torus by ac discharge cleaning
[IPPJ-595] N82-34246
Evolution of ring current formed by relativistic electron beam injection into a charge but not current neutralizing plasma
[IPPJ-576] N82-34247
Alternative representations of the inverse scattering transformation for the K-d V equation and the modified K-d equation
[IPPJ-581] N82-34248
Transport code study of electron cyclotron heating in Tokamaks
[IPPJ-582] N82-34249
High energy tail production by higher harmonic frequency up to 5 omega ci
[AD-B067129] N82-34250
Interrelation of alternative sets of Lax-pairs for a generalized nonlinear Schroedinger equation
[IPPJ-585] N82-34251
Average beta value of axially symmetric plasma
[IPPJ-586] N82-34252
A scaling law of neutron yield for DT discharge in plasma focus
[IPPJ-600] N82-34254
Formation of z-discharged plasma channel in LIB-fusion device
[IPPJ-601] N82-34255
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Computer-aided manufacturing: An international comparison
[PB82-172321] N82-33573
Coal mining and ground-water resources in the United States
[PB82-182056] N82-33903
Indoor pollutants
[PB82-180563] N82-33904
Formaldehyde and other aldehydes
[PB82-180498] N82-33909
NATIONAL AERONAUTICAL ESTABLISHMENT, OTTAWA (ONTARIO).
An experimental study of the transonic equivalence rule with lift
[AD-A117019] N82-33350
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
INTELSAT V-E(F-5)
[NASA-TM-84857] N82-33413
Strength diagrams of fibrous composites with unidirectional structure
[NASA-TM-76975] N82-33433
Activities in planetary geology for the physical and earth sciences
[NASA-EP-179] N82-33789
Aerospace medicine and biology. A continuing bibliography with indexes, supplement 235, August 1982
[NASA-SP-7011(235)] N82-33995
Mission operation report. Space Shuttle program: STS-4 postflight medical operations report
[NASA-TM-84854] N82-34001
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Recent progress in VSTOL technology
[NASA-TM-84238] N82-33334
User's manual for interfacing a leading edge, vortex rollup program with two linear panel methods
[NASA-TM-78584] N82-33340
Finite difference modeling of rotor flows including wake effects
[NASA-TM-84280] N82-33345
Recent applications of the transonic wing analysis computer code, TWING
[NASA-TM-84283] N82-33346
Computational aerodynamics and design
[NASA-TM-84257] N82-33348
An Operational evaluation of head up displays for civil transport operations. NASA/FAA phase 3 report
[NASA-TP-1815] N82-33381
A ground-simulator investigation of helicopter longitudinal flying qualities for instrument approach
[NASA-TM-84225] N82-33398
Analysis of several glidepath and speed control autopilot concepts for a powered lift STOL aircraft
[NASA-TM-84282] N82-33400
High performance channel injection sealant invention abstract
[NASA-CASE-ARC-14408-1] N82-33523
Computation of two-dimensional turbulent flow at subsonic Mach numbers over thick trailing edges
[NASA-TM-84278] N82-33663
Stimulation of body weight increase and epiphyseal cartilage growth by insulin like growth factor
[NASA-TM-84285] N82-33983
Sixteenth Annual Conference on Manual Control
[NASA-TM-84273] N82-34037
Effect of counting and tracking on verbal and production methods of time estimation N82-34049
Evaluation of a trajectory command concept for manual control of carrier approaches and landings N82-34060
Separation monitoring with four types of predictors on a cockpit display of traffic information N82-34063
A comparison of control modes for time-delayed remote manipulation N82-34072
Noise measurement in wind tunnels, workshop summary
[NASA-TM-84219] N82-34188
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Prototype design and initial test evaluation of a Global Positioning System Time Transfer Receiver (GPS TTR)
[NASA-TM-84721] N82-33364
Use of the Charge/Discharge (C/D) ratio to aument voltage limit (V sub T) charge control in the ERBS spacecraft
[NASA-TM-83991] N82-33824
The geologic record of climatic change
[NASA-TM-83956] N82-33946
The multi-parameter remote measurement of rainfall
[NASA-TM-83971] N82-33947
Einstein Observatory solid state spectrometer observations of M87 and the Virgo cluster
[NASA-TM-83946] N82-34314
Catalog of infrared observations
[NASA-TM-83819] N82-34319
A theory of the Io phase asymmetry of the Jovian decametric radiation
[NASA-TM-83994] N82-34325
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Shuttle STS-2 mission communication systems RF coverage and performance predictions. Volume 1: Ascent
[NASA-TM-84853] N82-33594
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. JOHN F. KENNEDY SPACE CENTER, COCOA BEACH, FLA.
Method for repair of thin glass coatings
[NASA-CASE-KSC-11097-1] N82-33520
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Results of buffet tests in a cryogenic wind tunnel
[NASA-TM-84520] N82-33342
NASA research on viscous drag reduction
[NASA-TM-84518] N82-33344
Family of airfoil shapes for rotating blades
[NASA-CASE-LAR-12843-1] N82-33372
Cryogenic wind tunnels: A selected, annotated bibliography
[NASA-TM-84474] N82-33405
Mechanical fastener
[NASA-CASE-LAR-12738-1] N82-33419
Illumination from space with orbiting solar-reflector spacecraft
[NASA-TP-2065] N82-33421
Positron annihilation spectroscopy with magnetically analyzed beams
[NASA-TM-84535] N82-33435
LARC-TPI: A multi-purpose thermoplastic polyimide
[NASA-TM-84516] N82-33530
Results from tests of three prototype general aviation seats
[NASA-TM-84533] N82-33733
Measured and calculated effects of angle of attack on the transonic flutter of a supercritical wing
[NASA-TM-83276] N82-33736
Improved damage tolerance of titanium by adhesive lamination
[NASA-TM-84525] N82-33737
Research in structural and solid mechanics, 1982
[NASA-CP-2245] N82-33739
Application of the reduced basis method to nonlinear transient thermal analysis N82-33743
Prediction of residual tensile strength of transversely impacted composite laminates N82-33745
the finite element machine: An experiment in parallel processing N82-33752

Extensional collapse modes of structural members
N82-33765
NECAP 4.1: NASA's Energy Cost Analysis Program engineering manual
[NASA-TM-83240] N82-33825
NECAP 4.1: NASA's Energy Cost Analysis Program engineering flow chart
[NASA-TM-83242] N82-33826
NASA participation in the 1980 PEPE/NEROS project: Data archive
[NASA-TM-83189] N82-33890
A tutorial solution to scattering of radiation in a thin atmosphere bounded below by a diffusely reflecting, absorbing surface
[NASA-TP-2077] N82-33918
An assessment of PERT as a technique for schedule planning and control
[NASA-TM-83265] N82-33981
A model-based technique for predicting pilot opinion ratings for large commercial transports N82-34050
Sonic boom measurement test plan for Space Shuttle STS-2 reentry
[NASA-TM-84858] N82-34186
Supersonic jet noise generated by large scale instabilities
[NASA-TP-2072] N82-34189
Circumferentially segmented duct lines optimized for axisymmetric and standing wave sources
[NASA-TP-2075] N82-34190
Simulation of the fluctuating field of a forced jet
[NASA-TM-84506] N82-34191
Survey of reader preferences concerning the format of NASA technical reports
[NASA-TM-84502] N82-34300

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

Rotor tip clearance effects on overall and blade-element performance of axial-flow transonic fan stage
[NASA-TP-2049] N82-33389
Chemical and electrochemical behavior of the Cr(3)/Cr(2) half cell in the NASA Redox Energy Storage System
[NASA-TM-82913] N82-33463
A study of the nature of solid particle impact and shape on the erosion morphology of ductile metals
[NASA-TM-82933] N82-33493
Surface texturing of fluoropolymers
[NASA-CASE-LEW-13028-1] N82-33521
Overlay metallic-cermet alloy coating systems
[NASA-CASE-LEW-13639-1] N82-33522
Summary of electric vehicle dc motor-controller tests
[NASA-TM-82953] N82-33636
Nonlinear constitutive theory for turbine engine structural analysis N82-33744
Design description of the Tangaye Village photovoltaic power system
[NASA-TM-82917] N82-33828
On the road performance tests of electric test vehicle for correlation with road load simulator
[NASA-TM-82900] N82-33829
Theoretical and experimental power from large horizontal-axis wind turbines
[NASA-TM-82944] N82-33830

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Spacelab mission 2: Experimental descriptions
[NASA-TM-82477] N82-33411
Atmospheric constraint statistics for the Space Shuttle mission planning
[NASA-TP-2069] N82-33417
Method for sequentially processing a multi-level interconnect circuit in a vacuum chamber
[NASA-CASE-MFS-15670-1] N82-33634
Optical Studies of model binary miscibility gap system
[NASA-TM-82494] N82-33683
Diffuser/ejector system for a very high vacuum environment
[NASA-CASE-MFS-15791-1] N82-33712
Shuttle VLBI experiment. Technical working group summary report
[NASA-TM-82491] N82-34315

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.

Sphere forming method and apparatus
[NASA-CASE-NPO-15070-1] N82-33567
Method and apparatus for self-calibration and phasing of array antenna
[NASA-CASE-NPO-15920-1] N82-33593
Low noise lead screw positioner
[NASA-CASE-NPO-15617-1] N82-33681
Hyperthermia heating apparatus
[NASA-CASE-NPO-14549-2] N82-33996

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

The effect of visual information on the manual approach and landing N82-34041

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).

An analytical prediction of pilot ratings utilizing human pilot model N82-34051

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

Computation of two-dimensional time-dependent natural convection of compressible fluid in a rectangular enclosure
[PB82-198797] N82-33679

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Method of evaluating the thermal stability of the pyroelectric properties of polyvinylidene fluoride effects of poling temperature and field
[AD-A117388] N82-33536
Development of an energy test method for a dedicated water-heating pump
[PB82-170069] N82-33575
Residential solar data center: Data resources and reports
[PB82-180845] N82-33883
Tables of energy-deposition distributions in water phantoms irradiated by point-monodirectional electron beams with energies from 1 to 60 MeV, and applications to broad beams
[PB82-178716] N82-34023
Triply differential studies of atomic and molecular photoionization using synchrotron radiation
[AD-A117247] N82-34198

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.

The white light solar corona: An atlas of K-coronameter synoptic charts, August 1980 - September 1981
[PB82-179706] N82-34334

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.

Solar-geophysical data prompt reports, number 446. Part 1: Data for September 1981, August 1981 and late data. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-171075] N82-34331
Solar-geophysical data prompt reports, number 447. Part 1: Data for October 1981, September 1981 and late date. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-177726] N82-34332
Solar-geophysical data comprehensive reports, number 447. Part 2: Data for May 1981, February 1980 and miscellanea. Explanation of data reports issued as number 438 (supplement) February 1981
[PB82-177734] N82-34333

NATIONAL MATERIALS ADVISORY BOARD, WASHINGTON, D. C.

An assessment of the impact of the Department of Defense very high speed integrated circuit program
[AD-A117459] N82-33646
Advanced joining technology
[AD-A117503] N82-33715

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.

The mean and variance of skywave radar sea-echo power spectra for discrete ionospheric multipath
[PB82-174236] N82-33631
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 2: The FACE-2 confirmatory radar rainfall and covariate data sets
[PB82-172131] N82-33963
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 4: FACE-2 microphysical data for analyses of seeded and unseeded cumulus towers
[PB82-172149] N82-33964

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.

Ocean thermal energy conversion, fiscal year 1981. Public Law 96-320 N82-33888

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).

Aeration-agitation control based on a mathematical model of the fermentation process
[NRC/CNR-TT-2029] N82-33461
Spherical agglomeration of flocculated precipitate
[NRC/CNR-TT-2024] N82-33462
Auto-oxidation of sulphites
[NRC/CNR-TT-2023] N82-33465
The problem of ensuring a specified molecular weight in the process of emulsion polymerization
[NRC/CNR-TT-2026] N82-33529

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.

Output tube emission characteristics of operational radars
[PB82-193426] N82-33633

NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH.

Forecasting heavy snow at Wenatchee, Washington
[PB82-177783] N82-33960

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.

Automated Low-cost Weather Observation System (ALWOS)
[AD-A117447] N82-33954

NAVAL AEROSPACE MEDICAL RESEARCH LAB., PENSACOLA, FLA.

Airsickness during Naval flight officer training: Advanced Squadron VT86-RIO (new syllabus)
[AD-A114685] N82-34011

NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.

Survey and update of F-14A mission profiles for TF30 engine usage
[AD-A116831] N82-33337
The AIDS/F-18 diffractive HUD
[AD-A116026] N82-33382
Blue Flight Coverall Program
[AD-A116856] N82-34082

NAVAL BIODYNAMICS LAB., NEW ORLEANS, LA.

Repeated measures of human performance: A bag of research tools
[AD-A113954] N82-34084

NAVAL CONSTRUCTION BATTALION CENTER, PORT HUENEME, CALIF.

Biodynamic data bank feasibility study
[AD-A117921] N82-34020

NAVAL HEALTH RESEARCH CENTER, SAN DIEGO, CALIF.

An EEG predictor of performance decrement in a vigilance task
[AD-A116960] N82-34014

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.

Decision-Feedback Equalizer Simulation (DFES): Description of variables
[AD-A117898] N82-33626
Approximate theory for the transverse motion of a two-layered plate. A theoretical model applicable to acoustic scattering from submerged structures with coating layer(s)
[AD-A117034] N82-33767
Development of a minicomputer atmospheric noise model
[AD-A117851] N82-33936
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) laboratory test results
[AD-A114073] N82-34012
A communications optical processing technique
[AD-A116047] N82-34219

NAVAL OCEANOGRAPHIC OFFICE, BAY ST. LOUIS, MISS.

Aeromagnetic detection and definition of seamounts
[AD-A117153] N82-33971

NAVAL PERSONNEL RESEARCH AND DEVELOPMENT CENTER, SAN DIEGO, CALIF.

A system for assessing user response to NAVPERRANDCEN RDT/E products
[AD-A117719] N82-34297

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.

Aerodynamic loads on a ball-obturated tubular projectile
[AD-A115756] N82-33349
Wind-tunnel drag measurements of a ball-obturated tubular projectile
[AD-A117268] N82-33351
Trailing vortices in stratified fluids
[AD-A117040] N82-33352
Investigation into Air Launch Cruise Missile (ALCM) flight information loading and display techniques during flex targeting procedure
[AD-A115744] N82-33376
Thermal martensitic transformation cycling in Cu-Zn-Al shape memory alloys
[AD-A117589] N82-33501
Communications processor for C3 analysis and wargaming
[AD-A115751] N82-33597
Measured performance of a delay lock tracking loop when noise power exceeds signal power
[AD-A116797] N82-33606
Marine atmospheric boundary layer and inversion forecast model
[AD-A115769] N82-33949

A version of the graphics-oriented interactive finite element time-sharing system (GIFTS) for an IBM with CP/CMS
[AD-A116798] N82-34092

Distributed versus centralized database systems: Transaction execution cost and performance analysis
[AD-A117915] N82-34097

Applications of artificial intelligence in voice recognition systems in micro-computers
[AD-A115735] N82-34132

The strength of surrogate constraints for the linear zero-one integer programming problem
[AD-A115736] N82-34137

Extensions of some models for positive-valued time series
[AD-A115754] N82-34138

Efficient multichannel autoregressive modeling in time and frequency domain
[AD-A115752] N82-34139

NOMBAS: A Bayesian procedure for selecting the greatest mean
[AD-A117611] N82-34178

Finite-amplitude standing waves in a cavity with boundary perturbations
[AD-A115719] N82-34192

NAVAL RESEARCH LAB., WASHINGTON, D. C.

Prototype design and initial test evaluation of a Global Positioning System Time Transfer Receiver (GPS TTR)
[NASA-TM-84721] N82-33364

A study of detonation structure: The formation of unreacted gas pockets
[AD-A117849] N82-33553

An approach to describing the functional requirements of an embedded communication system
[AD-A115738] N82-33598

A conversational test for comparing voice systems using working two-way communication links
[AD-A116054] N82-33599

Tracking closely spaced multiple sources via spectral-estimation techniques
[AD-A116967] N82-33607

Properties of even length Barker codes and specific polyphase codes with Barker type autocorrelation functions
[AD-A117415] N82-33622

Pinch-reflex-diode scaling on the aurora pulser
[AD-A116055] N82-33638

Electron drift in a linear magnetic wiggler with an axial guide field
[AD-A115739] N82-33700

The effects of transverse gradient of static magnetic wigglers on the free electron laser
[AD-A116968] N82-33704

Electron velocity shear instability in the auroral ionosphere
[AD-A116848] N82-33922

An atlas of ionospheric F-region structures as determined by the NRL-747/S3-4 ionospheric irregularities satellite investigation
[AD-A117269] N82-33923

A survey of ionospheric models: A preliminary report on the development of an ionospheric model thesaurus and users guide
[AD-A117659] N82-33935

Effect of an electron beam on the current convective instability
[AD-A117908] N82-33937

Variational analysis and approximate solutions for transport phenomena
[AD-A117110] N82-34147

Effect of magnetic shear on the electrostatic ion cyclotron waves in magnetospheric plasmas
[NASA-CR-169229] N82-34183

A synchronous phase detection system for an optical interferometric sensor
[AD-A117435] N82-34229

Microwave energy coupling in a nitrogen breakdown plasma
[AD-A117900] N82-34258

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.

Lift system and fan performance of air cushion supported vehicles
[AD-A117363] N82-33570

The development of a thermal distortion code using the finite element method
[AD-A116868] N82-33766

NASTRAN and FEARS analysis of two problems of plane elasticity
[AD-A117713] N82-33782

NAVAL SUBMARINE BASE, NEW LONDON, CONN.

Cold weather goggles. Part 3: Resistance to fogging
[AD-A115898] N82-34078

NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.

Effect of satellite orbit error on computed coordinates of Doppler receivers
[AD-A116894] N82-33416

SEASAT satellite radar altimetry data processing system
[AD-A115972] N82-33797

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.

Numerical solution of an ill-posed problem arising in wind tunnel heat transfer data reduction
[AD-A117572] N82-33409

An inviscid computational method for tactical missile configurations
[AD-A116904] N82-33415

NAVAL TRAINING EQUIPMENT CENTER, ORLANDO, FLA.

Math model description for the Visual Technology Research Simulator (VTRS) conventional takeoff and landing (CTOL) weapon delivery visual system
[AD-A117141] N82-33407

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.

Doppler spectra of sea-surface backscatter at high acoustic frequencies
[AD-A117682] N82-33978

IFD: An implicit finite-difference computer model for solving the parabolic equation
[AD-A117701] N82-34156

NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.

Synthesis and characterization of new insensitive high energy polynitramine compound, 2,4,8,10-tetranitro-2,4,8,10-tetraazaspiro (5.5) undecane (TNSU)
[AD-A116832] N82-33533

Overview of the aerothermal environment of air-launched missiles
[AD-A116799] N82-33924

Atmospheric visibility measurements at China Lake: A 5-year nephelometry summary
[AD-A116794] N82-33925

Ultraviolet enhanced deposition from pentacarbonyl-iron on gallium arsenide, quartz, and sapphire
[AD-A116800] N82-34278

NEVADA UNIV., RENO.

The vapor pressure of salt (HCl) water solutions below 0 deg C
[AD-A117080] N82-33549

NEW JERSEY INST. OF TECH., NEWARK.

Predictive model for jet engine test cell opacity
[AD-A117585] N82-33397

Mercury cadmium telluride sputtered target research
[AD-A117456] N82-33572

NEW JERSEY STATE DEPT. OF TRANSPORTATION, TRENTON.

Pavement roughness evaluations using a Mays Ride Meter
[PB82-177841] N82-33580

NEW MEXICO STATE UNIV., LAS CRUCES.

Structures of memory for critical flight information
[AD-A116510] N82-34028

NEW MEXICO UNIV., ALBUQUERQUE.

BLEST impulse time-of-flight sphere
[AD-A116940] N82-33686

Study of molecular collision dynamics for chemical laser systems
[AD-A117938] N82-33709

Reinforced concrete modeling
[AD-A117925] N82-33775

NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION, ALBANY.

Electrical energy consumption and heating requirements of municipal wastewater treatment plants
[PB82-183393] N82-33882

NEW YORK STATE DEPT. OF TRANSPORTATION, ALBANY.

The Catskill-Cairo experimental rigid pavement: A ten-year progress report
[PB82-201229] N82-33589

NEW YORK UNIV., BUFFALO.

Dynamic response of lined tunnels by boundary elements N82-33755

NEW YORK UNIV., NEW YORK.

Existence of a global weak solution to the nonlinear waterhammer program
[DE82-010717] N82-33678

Anomalous reorganization free energies in optical electron transfer in solution
[AD-A117680] N82-34202

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.

Euler solutions of supersonic wing-body interference at high incidence including vortex effects
[NEAR-TR-263] N82-33341

NORTH ATLANTIC TREATY ORGANIZATION. MILITARY AGENCY FOR STANDARDIZATION.

NATO glossary of terms and definitions (English and French)
[AD-A117715] N82-34290

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIV., GREENSBORO.

A computer aided workstation assesor for crew operations - WOSTAS
[AD-A116045] N82-34079

NORTH CAROLINA STATE UNIV., RALEIGH.

System identification: A question of uniqueness, revisited N82-33763

NORTH CAROLINA UNIV., CHAPEL HILL.

Optimization algorithms on random graphs
[AD-A115804] N82-34140

NORTHEASTERN UNIV., BOSTON, MASS.

Studies in on-line reversed phase liquid chromatography/mass spectrometry N82-33452

Investigations into a more general solution to the problem of matrix interferences in combined atomizer atomic absorption spectrometry N82-33454

NORTHWESTERN UNIV., EVANSTON, ILL.

Studies of metal: Semiconductor interfaces in catalysis and energy conversion
[DE82-011863] N82-33509

Mechanics of surface damage in elastohydrodynamic contacts
[AD-A117458] N82-33537

A dynamic model of the cervical spine and head
[AD-A114887] N82-34008

NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT, KJELLER.

The behaviour of Al electrodes in aqueous solutions
[NDRE/PUBL-81/1003] N82-33460

Continuously-tunable high-repetition rate RF-excited CO2 waveguide laser
[NDRC/PUBL-82/1002] N82-33695

NOVA UNIV., DANIA, FLA.

Modeling and adjusting global ocean tides using SEASAT altimeter data
[AD-A115841] N82-33972

NUCLEAR UTILITY SERVICES, INC., ROCKVILLE, MD.

Integrated environmental and safety assessment of selected mechanical energy storage systems
[DE82-902073] N82-33851

O

OAK RIDGE NATIONAL LAB., TENN.

Testing of tritium-powered runway distance and taxiway markers
[AD-A114558] N82-33408

Review of recent irradiation-creep results
[DE82-014570] N82-33512

Microstructural analysis of austenitic stainless steel welds and their modification during laser welding
[DE82-016036] N82-33515

Stirling engine with one adiabatic cylinder
[DE82-009606] N82-33849

Energy storage using phase-change materials for active solar heating and cooling: An evaluation of future research and development direction
[DE82-014656] N82-33857

Storage-efficient method for construction of a Thiessen triangulation
[DE82-014571] N82-34117

Negative-ion-beam generation with the ORNL SITEX source
[DE82-016042] N82-34211

Environmental assessment model for shallow land disposal of low-level radioactive wastes
[DE82-001830] N82-34214

Calibration of a diamagnetic diagnostic for stored energy of high-temperature electron annuli in Elmo Bumpy Torus (EBT)
[DE82-015235] N82-34271

Mullite-titanium dioxide solid solutions
[DE82-009031] N82-34288

OAK RIDGE Y-12 PLANT, TENN.

Thermal conductivity of electroless nickel-phosphorus alloy plating
[DE82-013529] N82-33510

OBSERVATORIO DEL EBRO, TORTOSA (SPAIN).

Lunar variation of several ionospheric parameters
[AD-A117689] N82-33938

OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, D. C.

Improving government information resources management
[PB82-183542] N82-34305

OFFICE OF THE DEPUTY SECRETARY OF DEFENSE, WASHINGTON, D. C.
The Department of Defense statement on the science and technology program by Mr. H. Mark Grove, Assistant Deputy Under Secretary of Defense for Research and Advanced Technology before the Defense Subcommittee of the Committee on Appropriations of the United States House of Representatives, 97th Congress, second session
[AD-A116788] N82-34339

OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING, WASHINGTON, D. C.
Optimal planning and execution of DOD VLSI activities
[AD-A117238] N82-33641

OGDEN AIR LOGISTICS CENTER, HILL AFB, UTAH.
Surveillance report. Stage 1: Dissected motors. Phase 13: Propellant and component testing
[AD-A117604] N82-33426

OHIO STATE UNIV., COLUMBUS.
Studies on the syntheses of boron hydride systems
[AD-A115817] N82-33467
Acoustic impedance measurement methods N82-33565
Plate vibration research, 1976-1980: Complicating effects N82-33729
Advances and trends in plate buckling research N82-33760
Combined discrete network. Continuous control modelling of operator behavior N82-34064
Optical flow and texture variables useful in simulating self motion
[AD-A117016] N82-34081

OKLAHOMA STATE UNIV., STILLWATER.
Characterization of coal-derived liquids and other fossil-fuel-related materials employing mass spectrometry
[DE82-015005] N82-33558

OKLAHOMA UNIV., NORMAN.
Research on dynamics of composite and sandwich plates, 1979 - 1981
[AD-A117946] N82-33441
Mechanics of bimodular composite structures
[AD-A117942] N82-33776
Analyses of beams constructed of nonlinear materials having different behavior in tension and compression
[AD-A117944] N82-33777
Analytical and experimental investigations of bimodular composite beams
[AD-A117945] N82-33778

OLD DOMINION UNIV., NORFOLK, VA.
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-169419] N82-33422

OPEN UNIV., MILTON (ENGLAND).
Sound attenuation over ground cover 3 N82-34337

OREGON UNIV., EUGENE.
Central production and small-angle elastic scattering in the valon model
[DE82-008367] N82-34205

ORLOC, KETTERING, OHIO.
A systems approach for crew station design and evaluation
[AD-A115663] N82-34080

P

PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Assessment of effectiveness of geologic isolation systems. Analytic modeling of flow in a permeable fissured medium
[DE82-009289] N82-33673
Geotechnical issues and guidelines for storage of compressed air in excavated hard rock caverns
[DE82-015027] N82-33872
Identification of energy conservation research opportunities: A review and synthesis of the literature
[DE82-015028] N82-33875
Development of materials for open cycle MHD
[DE82-008777] N82-34261

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Moessbauer spectroscopic and related characterization of Fischer-Tropsch catalysts
[DE82-009280] N82-33476
Elastic/plastic finite element analysis of a single edge-cracked beam subjected to mode 1 tensile loading
[AD-A117622] N82-33773

PENNSYLVANIA UNIV., PHILADELPHIA.
Effects of residual impurities on hydrogen assisted cracking in high strength steels
[AD-A116966] N82-33497
Effects of residual impurities on hydrogen assisted cracking in high strength steels, part 1
[AD-A116948] N82-33498

PERCEPTRONICS, INC., WOODLAND HILLS, CALIF.
HRTES Human Resources Test and Evaluation System. Volume 1: Test procedures
[AD-A115594] N82-34029
HRTES Human Resources Test and Evaluation System. Volume 2: Supplement
[AD-A115595] N82-34030

PHILADELPHIA ELECTRIC CO., PA.
Evaluation of underground dc transmission systems
[DE82-012312] N82-33660

PITTSBURGH AND MIDWAY COAL MINING CO., ENGLEWOOD, COLO.
Solvent Refined Coal (SRC) Process. Effect of mixing energy on hydrogen reaction rates in SRC-11 reactors
[DE82-008447] N82-33481

PITTSBURGH UNIV.,
Age dependent minimal repair
[AD-A116846] N82-33336
Fundamental research directed to advanced high temperature coating systems beyond the current state-of-the-art systems
[AD-A117845] N82-33504
Comparing coherent systems
[AD-A116813] N82-34162
Inequalities on distributions: Bivariate and multivariate
[AD-A116814] N82-34163
A concept of negative dependence using stochastic ordering
[AD-A116888] N82-34164

PLANNING RESEARCH CORP., MCLEAN, VA.
Improved microprocessor design
[AD-A110858] N82-34088

POLYTECHNIC INST. OF NEW YORK, BROOKLYN.
Scheduling maintenance operations which cause age-dependant failure rate changes
[AD-A117267] N82-34293
Stochastic availability of a repairable system with an age and maintenance dependent failure rate
[AD-A116932] N82-34294

PRATT AND WHITNEY AIRCRAFT GROUP, EAST HARTFORD, CONN.
Structural tailoring of engine blades (STAEBL)
[NASA-CR-167949] N82-33391
Energy efficient engine: Turbine transition duct model technology report
[NASA-CR-167996] N82-33394

PRATT AND WHITNEY AIRCRAFT GROUP, WEST PALM BEACH, FLA.
Augmentor stability management program
[AD-A117926] N82-33428

PRINCETON UNIV., N. J.
Platonic plate tectonics: On the regularity of the distribution of triple points on the Earth's surface
[AD-A113777] N82-33931
Pilot opinions of sampling effects in lateral-directional control N82-34053
Logarithmic derivatives of two normalizing functions
[AD-A117516] N82-34180

PROCEDYNE CORP., NEW BRUNSWICK, N. J.
Conversion of waste plastics to fuel oil
[DE82-002454] N82-33873

PURDUE UNIV., LAFAYETTE, IND.
Fault diagnosis of nonlinear analog circuits. Volume 1. DC diagnosis of hard failures
[AD-A117567] N82-33645
Human capital adjustments to technological change in the computer industry: The case of scientists and engineers
[PB82-180969] N82-34036
Experimental investigation of programming complexity in COBOL
[AD-A116811] N82-34108
Edgeworth expansions in statistics: A brief review
[AD-A117061] N82-34165

R

RAND CORP., SANTA MONICA, CALIF.
Reflections on an F-43 in flight emergency
[AD-A116873] N82-33358
On the modelling of creative behavior
[AD-A116896] N82-34027
Palm's theorem for nonstationary processes
[AD-A117089] N82-34135

RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Composite structural materials
[NASA-CR-169345] N82-33434
Octree generation, analysis and manipulation
[AD-A117450] N82-34112
Asymptotic and numerical methods for vector systems of singularly-perturbed boundary value problems
[AD-A117111] N82-34141

RESOURCE PLANNING ASSOCIATES, INC., CAMBRIDGE, MASS.
The potential for industrial cogeneration development by 1990
[RA-81-1455] N82-33822

ROCHESTER UNIV., N. Y.
Problems in multivariate analysis and nonparametric statistics: Applications of the theory of combining tests
[AD-A117092] N82-34166

ROCKET RESEARCH CORP., REDMOND, WASH.
Development of a long-life high-temperature catalyst for the SO2/SO3 energy-storage system
[DE82-009723] N82-33840

ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF.
Method for repair of thin glass coatings
[NASA-CASE-KSC-11097-1] N82-33520

ROCKWELL INTERNATIONAL CORP., LOS ANGELES, CALIF.
Investigation of aircrew protection during emergency escape at dynamic pressures up to 1600 Q
[AD-A117552] N82-33359

ROCKWELL INTERNATIONAL CORP., THOUSAND OAKS, CALIF.
Fracture and fatigue characteristics in titanium alloys
[AD-A117155] N82-33499

ROCKWELL INTERNATIONAL SCIENCE CENTER, THOUSAND OAKS, CALIF.
Advanced on-board signal processor gallium arsenide memory
[AD-A117151] N82-34091
Growth of HgCdTe by modified molecular beam epitaxy
[AD-A117752] N82-34199

ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.
An iterative phase-only nulling method
[AD-A116949] N82-33604

ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
A laboratory model for the evaluation of the toxic natures of combustion products
[RAE-TRANS-2083] N82-33464

RUTGERS - THE STATE UNIV., NEW BRUNSWICK, N. J.
Nondestructive method for determining fatigue and stress-corrosion damage
[AD-A117631] N82-33774

RUTGERS UNIV., NEW BRUNSWICK, N. J.
The CRITTER system: Analyzing digital circuits by propagating behavior and specifications
[AD-A117887] N82-33650

S

SACLANT ASW RESEARCH CENTER, LA SPEZIA (ITALY).
Observations of the Huelva Cool-Water Tongue
[AD-A115673] N82-33973

SANDIA LABS., ALBUQUERQUE, N. MEX.
Explosive-powder compaction system
[DE82-003134] N82-33558
Underground scanning with an impulse radar
[DE82-015495] N82-33630
Instability in simple shear deformation of stress-softening materials
[DE82-013525] N82-33786
Intermediate photovoltaic system application experiment operational performance. Volume 6: Newman Power Station, El Paso, Texas
[DE82-008483] N82-33846
Intermediate photovoltaic system application experiment operational performance. Volume 8: Newman Power Station, El Paso, Texas
[DE82-014247] N82-33858
Numerical analysis of hydraulically-driven fractures
[DE82-015501] N82-33939
Seafloor earthquake measurement system. Volume 2: Electronic hardware description
[DE82-009319] N82-33942
XERROR: The SLATEC error-handling package
[DE82-015494] N82-34116
Three-dimensional thermal analysis for a conceptual high-level waste repository in welded tuff
[DE82-015503] N82-34217

SANDIA LABS., LIVERMORE, CALIF.
Screening tests of conformally-coated printed wiring boards
[DE82-012873] N82-33656

SAO PAULO UNIV. (BRAZIL).
Simple way of solving the hydrogen atom problem
[DE82-700020] N82-34204

SASKATCHEWAN UNIV., SASKATOON.
Solution of Von Karman's plate equation with perturbation and series summation N82-33761

SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.
Responses to harmonic acceleration with varying head positions
[AD-A114736] N82-34010
SCIENCE APPLICATIONS, INC., BOULDER, COLO.
Effects of ion-bounce resonances on ballooning-interchange modes
[DE82-014405] N82-34268
SCIENCE APPLICATIONS, INC., GOLDEN, COLO.
Flow characteristics in geopressured zones and salt water aquifers
[PB82-181280] N82-33807
SCIENCE APPLICATIONS, INC., MCLEAN, VA.
Statistical analysis of upper ocean time series of vertical shear
[AD-A117286] N82-33969
SCIENCE APPLICATIONS, INC., PLEASANTON, CALIF.
Moving finite elements in 2-D
[AD-A117078] N82-34142
SCIENCE APPLICATIONS, INC., SAN DIEGO, CALIF.
AVHRR measurements of atmospheric aerosols over oceans
[PB82-172115] N82-33945
SCIENCE INFORMATION SERVICES, INC., PHILADELPHIA, PA.
Biological Effects of Nonionizing Electromagnetic Radiation: A digest of current literature, July through September 1981, volume 6, number 1
[PB82-176504] N82-34024
SCIENTIFIC RESEARCH ASSOCIATES, INC., GLASTONBURY, CONN.
Three-dimensional numerical studies of the physics of semiconductor crystal growth
[AD-A116861] N82-34277
SEVILLE RESEARCH CORP., PENSACOLA, FLA.
The effects of pilot experience of acquiring instrument flight skills, phase 2
[AD-A113576] N82-34033
SHOCK AND VIBRATION INFORMATION CENTER (DEFENSE), WASHINGTON, D. C.
The Shock and Vibration Digest, volume 14, no. 1
[AD-A111336] N82-33561
The Shock and Vibration Digest, volume 14, no. 2
[AD-A111521] N82-33564
The Shock and Vibration Digest, volume 13, no. 10
[AD-A106486] N82-33727
The Shock and Vibration Digest, volume 13, no. 11
[AD-A108209] N82-34336
SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS.
Investigate the time evolution of the correlation between bathymetry and geoid height in the Pacific Ocean
[PB82-172099] N82-33944
SOLAR TURBINES INTERNATIONAL, SAN DIEGO, CALIF.
Advanced ceramic coating development for industrial/utility gas turbines
[NASA-CR-169652] N82-33494
Low NOx heavy fuel combustor concept program
[NASA-CR-165481] N82-33827
SOLVENT REFINED COAL INTERNATIONAL, INC., ENGLEWOOD, COLO.
Status report for the Solvent-Refined-Coal (SRC-2) demonstration project
[DE82-009653] N82-33483
SONICRAFT, INC., CHICAGO, ILL.
The role of meteorological satellites in tactical battlefield weather support
[AD-A116936] N82-33950
SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY, RAPID CITY.
Polymer concrete and its application to bridge deck maintenance
[PB82-177940] N82-33579
SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION, INC., ST. CLOUD, FLA.
USAF Summer Faculty Research Program. Volume 1: 1981 research reports
[AD-A113708] N82-34340
USAF Summer Faculty Research Program. Volume 2: 1981 research reports
[AD-A113709] N82-34341
SOUTHERN METHODIST UNIV., DALLAS, TEX.
The G-spectral estimator
[AD-A116942] N82-34144
Robust regression procedures for predictor variable outliers
[AD-A117022] N82-34167
Optimal grouping, spacing, stratification and piecewise constant approximation
[AD-A117023] N82-34168
Related correlation coefficients
[AD-A117231] N82-34169
On the correlation of a group of rankings with an external ordering relative to the internal concordance
[AD-A117232] N82-34170
Method of moments estimators for the moving average coefficients in an ARMA (p,q) process
[AD-A116943] N82-34171
A quantile domain perspective on the relationships between optimal grouping, spacing and stratification problems
[AD-A116944] N82-34172
SOUTHERN SOLAR ENERGY CENTER PLANNING PROJECT, ATLANTA, GA.
Solar-heated municipal swimming pools, a case study: Dade County, Florida
[DE82-009475] N82-33844
Residential heating and cooling loads and costs for the South
[DE82-009504] N82-33853
Wind energy feasibility assessment for the US Virgin Islands, siting assessment, economic study and project plan
[DE82-009476] N82-33961
SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Multi-ion interactions and defects in metals
[AD-A117451] N82-33502
Stress corrosion characterization of turbine rotor materials, phase 1
[DE82-902070] N82-33508
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N82-33526
Research on fire-resistant diesel fuel
[AD-A117408] N82-33550
Basic techniques in availability engineering
[DE82-903666] N82-34298
SPECTRON DEVELOPMENT LABS., INC., COSTA MESA, CALIF.
Investigation of the Rayleigh critical angle phenomenon for the characterization of surface properties
[AD-A117264] N82-33723
STANFORD UNIV., CALIF.
Modelling of deformation and fracture in high-temperature structural materials
[DE82-013040] N82-33511
On the adaptive implementation of Pisarenko's harmonic retrieval method
[AD-A116003] N82-33600
The structure and growth of the mixing layer region of a round jet
[SU-TF-17] N82-33664
The analysis of elastic-plastic deformation and stress at finite strain and their evaluation
[AD-A117505] N82-33779
Preliminary study of in-situ combustion in diatomites
[DE82-013272] N82-33862
System study of an MHD/gas turbine combined-cycle baseload power plant
[DE82-015215] N82-33869
Density measurement in air with saturable absorbing seed gas
[NASA-CR-169420] N82-33919
Users guide for SOL/QPSOL: A FORTRAN package for quadratic programming
[AD-A117607] N82-34114
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic paricles
[NASA-CR-169416] N82-34197
Private financing and operation of a space station: Investment requirements, risk, government support and other primary business management considerations
[NASA-CR-169357] N82-34291
On the thermal stability of coronal loop plasma
[NASA-CR-169347] N82-34327
The impulsive phase of solar flares. 2: Characteristics of the hard X-rays
[NASA-CR-169379] N82-34328
STATE UNIV. OF NEW YORK, BINGHAMTON.
Bayes adaptive estimation of the point of shift to the wear-out phase of reliability systems
[AD-A117865] N82-33725
STATE UNIV. OF NEW YORK, BROOKLYN.
Some computer applications and digital image processing in nuclear medicine N82-34000
STATE UNIV. OF NEW YORK, BUFFALO.
The adsorption and oxidation of carbon monoxide in strong acid solutions N82-33449
A computer package for the design and eigenproblem solution of damped linear multidegree of freedom systems N82-33764
Influence of the diving response and submersion on the breath-holding time in man N82-33998
STOLLER (S. M.) CORP., BOULDER, COLO.
Basic techniques in availability engineering
[DE82-903666] N82-34298
STRESS TECHNOLOGY, INC., ROCHESTER, N.Y.
The literature of vibration engineering N82-33562
SUNTECH, INC., MARCUS HOOK, PA.
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil, part 5
[AD-A117438] N82-33551
SURFACE ANALYTIC RESEARCH, INC., MOUNTAIN VIEW, CALIF.
Dynamic mechanical analysis and organization/storage of data for polymetric materials
[NASA-CR-166413] N82-33527
Quantum chemical calculations for polymers and organic compounds
[NASA-CR-166414] N82-33528
SUSQUEHANNA RESOURCES AND ENVIRONMENT, INC., JOHNSON CITY, N.Y.
Applications of texture analysis for rock types discrimination
[AD-A117076] N82-33798
SYNERGISTIC DESIGN AND ENGINEERING, MINNEAPOLIS, MINN.
Home retrofitting for energy conservation and solar considerations
[DE82-013420] N82-33860
SYRACUSE UNIV., N. Y.
Selective metal-ion extraction for multiple-ion liquid-liquid exchange reactions
[DE82-011721] N82-33474
SYSTEMS ARCHITECTS, INC., RANDOLPH, MASS.
Improving software quality assurance methods
[AD-A116980] N82-34109
SYSTEMS CONTROL, INC., PALO ALTO, CALIF.
Enhancements and algorithms for avionic information processing system design methodology
[AD-A117948] N82-33385
SYSTEMS PLANNING CORP., ARLINGTON, VA.
Alternative employment concepts for Remotely Piloted Vehicle (RPV) FLIR/TV mission payload
[AD-A117877] N82-33379
SYSTEMS RESEARCH LABS., INC., DAYTON, OHIO.
Advanced nondestructive evaluation (ultrasonic pulser/receiver technology)
[AD-A117841] N82-33724
Finite-element analysis of some full- and partial-ring crack-propagation test specimens
[AD-A117674] N82-33783
A gunner model for an AAA tracking task with interrupted observations N82-34039
Application of optimal control principles to describe the supervisory control behavior of AAA crew members N82-34067
SYSTEMS SCIENCE AND SOFTWARE, LA JOLLA, CALIF.
Three-dimensional velocity structure of the crust and upper mantle beneath the Nevada test site
[AD-A114241] N82-33932
SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
Description/demonstration of BIODYN-80. A software package for evaluating the transmissibility between vehicle vibration and motions of hands (in controls), limbs, head and eyes N82-34057
A comprehensive system model for motion/space sickness. Preliminary results N82-34059
SYSTEMS TECHNOLOGY, INC., MOUNTAIN VIEW, CALIF.
Training aircraft design considerations based on the successive organization of perception in manual control N82-34043
Application of a pilot control strategy identification technique to a joint FAA/NASA ground-based simulation of head-up displays for CTOL aircraft N82-34061

T

TECHNICAL RESEARCH CENTRE OF FINLAND, ESPOO.
Weld thermal simulator
[PB82-207283] N82-33583
Comparison between shear wave ultrasonic examination and radiographic examination of some austenitic stainless steel pipe welds
[PB82-207267] N82-33584
Program package for nonlinear analysis of reinforced concrete structures
[PB82-204744] N82-33585
Real-time control of GMA welding
[PB82-204660] N82-33721
GMA welding experiments using real-time control
[PB82-204652] N82-33722
Investigations on the improvement of corrosion resistance and strength of ribbed reinforcing steel bars in concrete, especially when subject to fatigue loading
[PB82-204330] N82-33787

TECHNION - ISRAEL INST. OF TECH., HAIFA.
Fatigue behaviour of advanced structural aluminium alloy 74575-T761
[TAE-447] N82-33492
Vibrations of axially loaded stiffened cylindrical panels with elastic restraints
[TAE-439] N82-33730
Further initial imperfection measurements of integrally Stringer stiffened cylindrical shell, series 2
[TAE-404] N82-33731
The fatigue notch factor revisited
[TAE-446] N82-33732

TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).
Supervision of dynamic systems: Monitoring, decision-making and control N82-34069

TECHNISCHE UNIV., GRAZ (AUSTRIA).
Registration of digitized aerial photography with a digital map data base
[AD-A117510] N82-33803

TELEDYNE CONTINENTAL MOTORS, MOBILE, ALA.
Exhaust emissions reduction for intermittent combustion aircraft engines
[NASA-CR-167914] N82-33392

TENNESSEE UNIV. SPACE INST., TULLAHOMA.
Numerical stability analysis of a compressor model
[AD-A116878] N82-33396

TENNESSEE VALLEY AUTHORITY, MUSCLE SHOALS, ALA.
Preliminary economic analysis of NO sub x flue-gas treatment processes using TVA and EPRI economic premises
[DE82-902223] N82-33895

TEXAS A&M UNIV., COLLEGE STATION.
Air pollutant production by algal cell cultures
[NASA-CR-166384] N82-34076
Time series model identification, spectral estimation and functional inference
[AD-A117073] N82-34146
Quantiles, parametric-select density estimations, and bi-information parameter estimators
[AD-A117460] N82-34153
Autoregressive spectral estimation and functional inference
[AD-A117113] N82-34173
Autoregressive spectral estimation
[AD-A117266] N82-34174
Maximum entropy interpretation of autoregressive spectral densities
[AD-A117263] N82-34175
Simultaneous confidence bands for autoregressive spectra
[AD-A117072] N82-34176

TEXAS INSTRUMENTS, INC., DALLAS.
Superconductive niobium oxide tunnel device program
[AD-A117000] N82-33642

TEXAS TECHNOLOGICAL UNIV., LUBBOCK.
The strength of weathered window glass using surface characteristics
[PB82-172735] N82-33546
Nonlinear analysis of rectangular glass plates by finite difference methods
[PB82-172552] N82-33547
Workshop on Diffuse Discharge Opening Switches
[AD-A115883] N82-33640

TEXAS UNIV., AUSTIN.
Thermal desorption of H2 and CO on Pt/TiO2
[AD-A117888] N82-33466
Characterization of species adsorbed on oxidized and reduced anatase
[AD-A117891] N82-33472
Dissociative adsorption of CO2 on oxidized and reduced Pt/TiO2
[AD-A117890] N82-33473
Methods for 2-beam array processing
[AD-A116880] N82-33605
An experimental study of bolted shear connections
[PB82-201518] N82-33788
Calderas and mineralization: Volcanic geology and mineralization in the Chianti caldera complex, Trans-Pecos Texas
[DE82-013263] N82-33941
A summary of the results of a study of acoustic bottom interaction in a range dependent environment
[AD-A116891] N82-33970
On the current status of theoretical modeling of acoustic waves in saturated sediments
[AD-A117847] N82-34194
Thomson scattering on the PRETEXT Tokamak
[DE82-009085] N82-34262

TEXAS UNIV., HOUSTON.
Insulin resistance for glucose metabolism in disused soleus muscle of mice
[NASA-CR-169353] N82-33979

TEXTRON BELL HELICOPTER, FORT WORTH, TEX.
Crashworthy airframe design concepts: Fabrication and testing
[NASA-CR-3603] N82-33735

THERMO ELECTRON CORP., WALTHAM, MASS.
Glass batch preheater: Phase 2. Laboratory testing
[PB82-180639] N82-33577

TOHOKU UNIV., SENDAI (JAPAN).
Propagation characteristics in a magnetized plasma-waveguide near the ion cyclotron frequency
[IPPJ-598] N82-34253

TOKYO UNIV. (JAPAN).
An experimental study of human pilot's scanning behavior N82-34044

TRANSPORT AND ROAD RESEARCH LAB., CROWTHORNE (ENGLAND).
Pavement thickness, surface evenness and construction practice
[PB82-202599] N82-33586

TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH, CALIF.
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889-VOL-1] N82-33424
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889-VOL-2] N82-33425

TUFTS UNIV., MEDFORD, MASS.
Viscosity dependence of the rates of diffusional processes
[NASA-CR-166394] N82-33982

U

ULTRASONICS INTERNATIONAL, INC., TREVOSE, PA.
Ultrasonic measurement of case depth in case hardened steels. Evaluation of feasibility for the ultrasonic measurement of case depth in case hardened steels
[AD-A117901] N82-33505

ULTRASYSTEMS, INC., FAIRFAX, VA.
Advanced bio-energy systems for Air Force installations
[AD-A117084] N82-33835

UNITED ENGINEERS AND CONSTRUCTORS, INC., PHILADELPHIA, PA.
Preliminary design study of compressed-air energy storage in a salt dome. Volume 1: Executive summary
[DE82-008345] N82-33877

UNITED STATES METRIC BOARD, ARLINGTON, VA.
Metric conversion in the United States N82-33568

UNITED TECHNOLOGIES CORP., SOUTH WINDSOR, CONN.
Evaluation of natural gas molten carbonate fuel cell power plants
[PB82-181272] N82-33881

UNIVERSITY OF SOUTHERN ILLINOIS, CARBONDALE.
Preprocessing techniques in transient analysis
[AD-A116860] N82-34143
Edgeworth expansions in statistics: A brief review
[AD-A117061] N82-34165

UNIVERSITY OF SOUTHERN ILLINOIS, EDWARDSVILLE.
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-169352] N82-33374

URBAN SCIENCES, INC., PENNSAUKEN, N.J.
Digital communications techniques and equipment for law enforcement use
[PB82-195496] N82-33632

UTAH UNIV., SALT LAKE CITY.
Fatigue of laminated composite structures
[AD-A117731] N82-33443
Photoacoustic spectroscopy at visible and infrared wavelengths N82-33448
The effects of processing conditions on the reliability of cross-linked polyethylene cable insulation
[DE82-011712] N82-33543
Equilibrium noise in ion selective field effect transistors
[AD-A117525] N82-33652

V

VEREINIGTE FLUGTECHNISCHE WERKE G.M.B.H., BREMEN (WEST GERMANY).
Parametric identification of human operator models N82-34045

VIRGINIA HIGHWAY AND TRANSPORTATION RESEARCH COUNCIL, CHARLOTTESVILLE.
Design of overlays based on pavement condition, roughness, and deflections
[PB82-201369] N82-33588

VIRGINIA INST. OF MARINE SCIENCE, GLOUCESTER POINT.
Hydrocarbon fuel chemistry: Sediment water interaction
[AD-A117928] N82-33552

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Rolling flow wind tunnel tests of F-18 aircraft
[NASA-CR-169344] N82-33338
Curved flow wind tunnnel test of F-18 aircraft
[NASA-CR-169345] N82-33339
Study of an automatic trajectory following control system
[NASA-CR-169361] N82-33399
Minimization versus homotopy algorithms N82-33741
Three-dimensional finite-element analysis of layered composite structures
[AD-A117492] N82-33780
A model of human decision making in multiple process monitoring situations N82-34065
The DMS multiprocess execution environment
[AD-A117660] N82-34096

VIRGINIA UNIV., CHARLOTTESVILLE.
Incompressible flow in a rapidly rotating cylinder with a source/sink distribution in the lateral wall and a free inner boundary
[DE82-011031] N82-33674
An exact zooming method for finite element analyses N82-33754

VITRO LABS., SILVER SPRING, MD.
Environmental data for sites in the national solar data network
[DE82-008076] N82-33959

W

WAPORA, INC., EARTH CITY, MO.
Terrestrial biological inventory, Hillview Drainage and Levee District, Greene and Scott Counties, Illinois
[AD-A115911] N82-33800

WASHINGTON STATE UNIV., PULLMAN.
Fracto-emission from polymers
[AD-A116786] N82-33535

WASHINGTON UNIV., SEATTLE.
Cloud and precipitation particle size spectra
[AD-A117457] N82-33956
Stress, anxiety, and cognitive interference: Reactions to tests
[AD-A113564] N82-34031

WASHINGTON UNIV., ST. LOUIS, MO.
Design of helicopter rotor blades for optimum dynamic characteristics
[NASA-CR-169352] N82-33374
Implementation of a C-1 triangular element based on the P-version of the finite element method N82-33749

WATERLOO UNIV. (ONTARIO).
Synthesis of frameworks under multilevel performance constraints N82-33757

WEIZMANN INST. OF SCIENCE, REHOVOTH (ISRAEL).
Mean field theory for lattice gauge systems with fermions
[DE82-700785] N82-34289

WEST VIRGINIA UNIV., MORGANTOWN.
Stress distribution and pillar design in oil shale retorts
[PB82-176256] N82-33582
In-situ measurement of particulate in turbulent duct flows
[DE82-010291] N82-33671

WESTERN GEOPHYSICAL CO. OF AMERICA, HOUSTON, TEX.
Airborne gamma-ray spectrometer and magnetometer survey: Alturas Quadrangle, California
[DE82-005539] N82-33805

WESTFAELISCHE WILHELMS UNIV., MUENSTER (WEST GERMANY).
Effects of motivation on car-following N82-34070

WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
Development of a high conductivity intercalated graphite composite wire
[DE82-008973] N82-33655
Spent fuel dry storage technology development: Electrically heated drywell storage test (3kW operation)
[DE82-012567] N82-34216

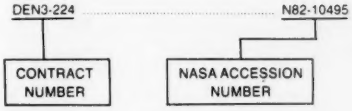
WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Ultraviolet-radiation-curable paints
[DE82-015717] N82-33545
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-009398] N82-33842
Mechanisms affecting mass transfer in fuel cells
[DE82-013431] N82-33876

WILLIAMS BROS. ENGINEERING CO., TULSA, OKLA.
Assessment of underground coal gasification in bituminous coals. Volume 1: Executive summary
[DE82-014584] N82-33557
WISCONSIN UNIV., MADISON.
Pulsed excitation and collisional processes
[AD-A116937] N82-33707
Low-frequency turbulence, particle and heat transport in the Wisconsin levitated octupole
[DE82-012557] N82-34263
WISCONSIN UNIV., MILWAUKEE.
Fifth International Summer Institute in Surface Science, ISISS 1981
[AD-A116933] N82-33469
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
Biomass production, anaerobic digestion, and nutrient recycling of small benthic or floating seaweeds
[DE82-009172] N82-33843
Estimates of crustal transmission losses using MLM array processing
[AD-A117278] N82-33929
Observations of vertically propagating equatorially-trapped waves in the deep western Indian Ocean
[NASA-CR-169375] N82-33974
Computer storage and retrieval of position: Dependent data
[AD-A116767] N82-34095
WRIGHT STATE UNIV., DAYTON, OHIO.
Radiation damage and annealing effects studies of silicon-implanted gallium arsenide
[AD-A117884] N82-34284
WYOMING UNIV., LARAMIE.
Measurement of tropospheric carbonyl sulfide by microwave spectrometry
[NASA-CR-169417] N82-33920
Ice forming experiment
[NASA-CR-170623] N82-33948
Turbulent diffusion studies of winter storms over the Sierra Nevada Mountains
[PB82-178898] N82-33965
Cloud physics studies in SCPP(Sierra Cooperative Pilot Project) during 1980-1981
[PB82-174210] N82-33967

Y

YALE UNIV., NEW HAVEN, CONN.
Stochastic games. 1: Foundations
[AD-A117085] N82-34177

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

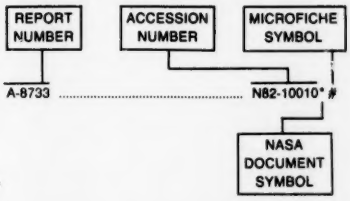
AF PROJ. 1900 ..... N82-33397
N82-33552
N82-33554
AF PROJ. 1987 ..... N82-33401
AF PROJ. 2054 ..... N82-33835
AF PROJ. 2157 ..... N82-33647
AF PROJ. 2301 ..... N82-33625
N82-33709
N82-34213
N82-34257
N82-34284
AF PROJ. 2303 ..... N82-33930
AF PROJ. 2304 ..... N82-33402
N82-33600
N82-34094
N82-34110
N82-34133
N82-34141
N82-34142
N82-34149
N82-34152
N82-34154
N82-34166
N82-34182
AF PROJ. 2305 ..... N82-33604
N82-33612
N82-33613
N82-33614
N82-33685
N82-33689
N82-34233
N82-34281
N82-34340
N82-34341
AF PROJ. 2306 ..... N82-33723
N82-34285
AF PROJ. 2307 ..... N82-33783
AF PROJ. 2308 ..... N82-33549
N82-33668
AF PROJ. 2309 ..... N82-33798
N82-33932
N82-33934
N82-33972
AF PROJ. 2310 ..... N82-33628
N82-33707
N82-33921
N82-33930
AF PROJ. 2311 ..... N82-34329
N82-34330
AF PROJ. 2312 ..... N82-34007
N82-34016
AF PROJ. 2313 ..... N82-34028
N82-34035
AF PROJ. 2338 ..... N82-33649
N82-33718
AF PROJ. 2401 ..... N82-33713
AF PROJ. 2403 ..... N82-34080
AF PROJ. 2417 ..... N82-33534
AF PROJ. 2418 ..... N82-33442
N82-33724
AF PROJ. 2419 ..... N82-33531
N82-33542
N82-33781
AF PROJ. 2422 ..... N82-33532
AF PROJ. 2480 ..... N82-33551
AF PROJ. 2531 ..... N82-34109
AF PROJ. 2688 ..... N82-33950
AF PROJ. 3066 ..... N82-33428
N82-33669
AF PROJ. 3145 ..... N82-33651
N82-33831
N82-33832
AF PROJ. 4049 ..... N82-33771
AF PROJ. 4519 ..... N82-33603
AF PROJ. 4594 ..... N82-34088
AF PROJ. 6609 ..... N82-34220
AF PROJ. 7055 ..... N82-34219
AF PROJ. 7231 ..... N82-33359
N82-34002
N82-34008
N82-34020
AF PROJ. 7755 ..... N82-34010
AF PROJ. 8809 ..... N82-33775
AF-AFOSR-0022-80 ..... N82-34257
AF-AFOSR-0078-81 ..... N82-34081
AF-AFOSR-0085-79 ..... N82-34193
AF-AFOSR-0089-80 ..... N82-33504
AF-AFOSR-0101-81 ..... N82-34284
AF-AFOSR-0103-81 ..... N82-34193
AF-AFOSR-0114-79 ..... N82-33938
AF-AFOSR-0158-80 ..... N82-34094
AF-AFOSR-0168-80 ..... N82-33934
AF-AFOSR-0170-81 ..... N82-34233
AF-AFOSR-0187-80 ..... N82-33628
AF-AFOSR-0192-80 ..... N82-34141
AF-AFOSR-0198-81 ..... N82-34152
AF-AFOSR-0218-81 ..... N82-34007
AF-AFOSR-0221-81 ..... N82-34154
AF-AFOSR-0234-81 ..... N82-33612
AF-AFOSR-0252-81 ..... N82-33749
AF-AFOSR-0261-80 ..... N82-33709
AF-AFOSR-0284-80 ..... N82-34281
AF-AFOSR-0543-82 ..... N82-34193
AF-AFOSR-2881-76 ..... N82-34191
AF-AFOSR-3071-76 ..... N82-34330
AF-AFOSR-3158-77 ..... N82-33402
AF-AFOSR-3182-77 ..... N82-34133
AF-AFOSR-3260-76 ..... N82-34062
AF-AFOSR-3271-77 ..... N82-34110
AF-AFOSR-3281-77 ..... N82-34182
AF-AFOSR-3333-77 ..... N82-33549
AF-AFOSR-3338-77 ..... N82-34149
AF-AFOSR-3356-77 ..... N82-33689
AF-AFOSR-3360-77 ..... N82-34166
AF-AFOSR-3488-78 ..... N82-34016
AF-AFOSR-3644-78 ..... N82-33447
AF-AFOSR-3665-78 ..... N82-34285
AF-AFOSR-3690-78 ..... N82-33625
AF-AFOSR-3711-78 ..... N82-34035
AM-1-9393 ..... N82-33979
ARPA ORDER 3045 ..... N82-34151
ARPA ORDER 3291 ..... N82-33932
ARPA ORDER 3674 ..... N82-33627
ARPA ORDER 3925 ..... N82-33352
ARPA ORDER 4049 ..... N82-33771
ARPA ORDER 4109 ..... N82-33723
ARPA ORDER 4147 ..... N82-33650
ARPA ORDER 4288 ..... N82-33798
ARPA ORDER 4383 ..... N82-34286
DA PROJ. 1L1-61101-A-91-A N82-33784
DA PROJ. 1L1-61102-AH-43 ..... N82-33355
N82-34148
DA PROJ. 1L1-61102-AH-60 ..... N82-33439
DA PROJ. 1L1-62706-A-553 ..... N82-33985
DA PROJ. 1L2-62111-AH-71 ..... N82-33802
DA PROJ. 1L2-62202-AH-85 ..... N82-33386
DA PROJ. 1L2-63104-D-150 ..... N82-33550
DA PROJ. 1L2-63211-D-315 ..... N82-34231
DA PROJ. 1L2-63211-DB-41 ..... N82-33716
DA PROJ. 1L6-62616-AH-77 ..... N82-33617
DA PROJ. 1L7-62733-AH-20 ..... N82-33526
N82-33550
DA PROJ. 1T1-61102-AH-51 ..... N82-33550
DA PROJ. 1T1-61102-BH-57 ..... N82-33803
DA PROJ. 3E1-61102-BS-10 ..... N82-33984
DA PROJ. 3E1-62777-A-878 ..... N82-34006
N82-34015
N82-34021
DA PROJ. 4A1-61101-A-91-D N82-34179
DA PROJ. 4A1-61102-AT-24 ..... N82-33926
DA PROJ. 4A6-161102-AT-24 ..... N82-33952
DA PROJ. 4A7-62707-A-855 ..... N82-33687
N82-33799
DA PROJ. 4A7-62719-AT-50 ..... N82-33629
DA PROJ. 4A7-62730-AT-42 ..... N82-33648
N82-33957
DA-ERO-77-G-043 ..... N82-33955
DAAB07-78-A-6606 ..... N82-33378
DAAD07-80-D-0206 ..... N82-33802
DAAG29-76-C-0031 ..... N82-33502
DAAG29-77-G-0209 ..... N82-34184
DAAG29-78-G-0066 ..... N82-33572
DAAG29-78-G-0112 ..... N82-33467
DAAG29-78-G-0199 ..... N82-33537
DAAG29-79-C-0047 ..... N82-33600
DAAG29-79-C-0049 ..... N82-33443
DAAG29-79-C-0079 ..... N82-33618
DAAG29-79-C-0099 ..... N82-33502
DAAG29-79-C-0110 ..... N82-34114
DAAG29-79-C-0155 ..... N82-34089
DAAG29-79-C-0158 ..... N82-34155
N82-34161
DAAG29-79-C-0161 ..... N82-34152
DAAG29-79-C-0173 ..... N82-34108
DAAG29-79-C-0205 ..... N82-33931
DAAG29-79-C-0215 ..... N82-33600
DAAG29-79-G-0005 ..... N82-33956
DAAG29-79-G-0017 ..... N82-33680
DAAG29-80-C-0070 ..... N82-34145
N82-34146
N82-34153
N82-34173
N82-34174
N82-34175
N82-34176
DAAG29-80-G-0011 ..... N82-33667
DAAG29-80-K-0084 ..... N82-34184
DAAG29-81-D-0100 ..... N82-33640
DAAG29-81-K-0002 ..... N82-33779
DAAG29-81-K-0156 ..... N82-34114
DAAG29-82-K-0084 ..... N82-33624
DAAG29-82-K-0089 ..... N82-33618
DAAK11-81-C-0081 ..... N82-34302
DAAK21-81-C-0116 ..... N82-33617
DAAK50-80-C-0011 ..... N82-33379
DAAK51-80-C-0028 ..... N82-34231
DAAK51-81-C-0008 ..... N82-33716
DAAK70-79-C-0153 ..... N82-34107
DAAK70-79-D-0036 ..... N82-33893
DAAK70-80-C-0001 ..... N82-33526
N82-33550
DAAK70-80-C-0045 ..... N82-33714
DAAK70-82-C-0001 ..... N82-33526
N82-33550
DAAK80-79-C-0270 ..... N82-33386
DACA31-80-D-0020 ..... N82-33835
DACW43-81-M-3145 ..... N82-33800
DAHC04-73-C-0022 ..... N82-33502
DAHC19-77-C-0055 ..... N82-34029
N82-34030
DAJA37-80-C-0020 ..... N82-33803
DARPA ORDER 3155 ..... N82-33395
DARPA ORDER 3704 ..... N82-34199
DARPA ORDER 3817 ..... N82-33704
DARPA ORDER 4100 ..... N82-34091
DARPA ORDER 4114 ..... N82-34222
DCA100-81-C-0024 ..... N82-33684
DE-AC01-76ET-10374 ..... N82-33693
DE-AC01-77ET-29332 ..... N82-33877
DE-AC01-78ET-29064 ..... N82-33659
DE-AC01-79CS-30027 ..... N82-33959
DE-AC01-79CS-40076 ..... N82-33873
DE-AC01-79CS-40210 ..... N82-33545
DE-AC01-79ET-29044 ..... N82-33655
DE-AC01-80ET-15611 ..... N82-33869
DE-AC01-80RA-50157 ..... N82-33658
DE-AC01-81FE-05122 ..... N82-33485

DE-AC02-76CH-00016 ..... N82-33477
N82-34022
N82-34203
N82-34266
DE-AC02-76CH-03000 ..... N82-34209
DE-AC02-76DP-00789 ..... N82-33942
DE-AC02-76ER-03077 ..... N82-33678
N82-34191
DE-AC02-76ET-20279 ..... N82-33868
DE-AC02-77CH-00178 ..... N82-33478
N82-33842
N82-33843
N82-33854
N82-33867
N82-33962
DE-AC02-78ET-51013 ..... N82-34118
N82-34269
DE-AC02-79CS-30150 ..... N82-33860
DE-AC02-79CS-30166 ..... N82-33844
N82-33853
DE-AC02-79ER-10473 ..... N82-34098
DE-AC02-81ER-10942 ..... N82-33506
DE-AC02-81ER-10956 ..... N82-34287
DE-AC02-81EV-10725 ..... N82-33896
DE-AC03-76ET-12056 ..... N82-33862
DE-AC03-76ET-53057 ..... N82-34268
DE-AC03-76SF-00098 ..... N82-33852
DE-AC03-80SF-11485 ..... N82-33845
N82-33878
DE-AC04-76DP-00613 ..... N82-33513
N82-33657
N82-33711
N82-33785
DE-AC04-76DP-00789 ..... N82-33556
N82-33630
N82-33656
N82-33786
N82-33840
N82-33846
N82-33858
N82-33861
N82-33879
N82-33939
N82-34116
N82-34217
DE-AC04-76EV-01013 ..... N82-33900
N82-33901
DE-AC05-76ET-10104 ..... N82-33481
DE-AC05-78OR-03055 ..... N82-33483
DE-AC05-79ET-60035 ..... N82-33839
DE-AC05-80RA-50158 ..... N82-33660
DE-AC05-82OR-20900 ..... N82-33674
DE-AC06-76ET-20242 ..... N82-33691
N82-33847
DE-AC06-76FF-02170 ..... N82-33517
DE-AC06-76RL-01830 ..... N82-33673
N82-33872
N82-33874
N82-33875
N82-33940
N82-34261
DE-AC07-76ID-01570 ..... N82-33507
N82-33682
N82-33855
N82-33856
DE-AC08-81NV-10171 ..... N82-34216
DE-AC09-76SR-00001 ..... N82-33458
DE-AC13-76GJ-01664 ..... N82-33805
N82-33806
N82-33941
DE-AC21-79ET-11028 ..... N82-33484
DE-AC21-79ET-15457 ..... N82-33516
DE-AC21-80MC-14584 ..... N82-33557
DE-AC21-80MC-14591 ..... N82-33480
DE-AC22-79PC-10350 ..... N82-33476
DE-AI01-76ET-20320 ..... N82-33830
DE-AI01-77CS-51040 ..... N82-34311
N82-34312
DE-AI01-77CS-51044 ..... N82-33636
N82-33829
DE-AI01-77ET-3111 ..... N82-33494
DE-AI01-77ET-13111 ..... N82-33827
DE-AI04-80AL-12726 ..... N82-33463
DE-AM01-76EI-02295 ..... N82-33859
N82-33866
DE-AM03-76SF-00326 ..... N82-33511
N82-34114
DE-AM06-77RL-00600 ..... N82-33876
DE-AM21-79MC-112284 ..... N82-33671
DE-AS01-76ET-10589 ..... N82-33558
DE-AS02-76ER-02978 ..... N82-34215
DE-AS02-76ET-53016 ..... N82-34270
DE-AS02-76ET-53051 ..... N82-34263
DE-AS02-77ET-33011 ..... N82-34208
DE-AS02-78ER-04940 ..... N82-33618
DE-AS02-78ER-04946 ..... N82-33509
DE-AS02-79ER-10406 ..... N82-33474
DE-AS02-79ER-10421 ..... N82-33543
DE-AS05-77ET-53042 ..... N82-34262
DE-AS05-79ER-10459 ..... N82-34185
DE-AS05-79ER-10521 ..... N82-34304
DE-AS09-76ER-00946 ..... N82-34206
DE-AT03-76ER-70057 ..... N82-33511
DE-AT03-76ER-72018 ..... N82-34114
DE-AT06-76ER-70004 ..... N82-34205
DE-FG01-79CS-20239 ..... N82-33850
DE-FG01-80RA-50313 ..... N82-33559
DEN3-32 ..... N82-34311
N82-34312
DEN3-109 ..... N82-33494
DEN3-145 ..... N82-33827
DI-BM-J0-188026 ..... N82-34086
DI-BM-J0-308030 ..... N82-33812
DI-7-07-83-V0001 ..... N82-33965
N82-33967
DOT-CG-39-81-C-80287 ..... N82-34230
DOT-FA74WA-3532 ..... N82-33361
DOT-FA79NA-6040 ..... N82-34033
DOT-FA79WA-4268 ..... N82-33388
DOT-FH-11-8900 ..... N82-33788
DTCG23-80-C-20019 ..... N82-33894
DTFA01-81-C-10109 ..... N82-33366
E(05-1)-1664 ..... N82-33941
EDA-05-06-01815-40 ..... N82-33885
EG-77-C-01-4042 ..... N82-33854
N82-33962
EPA-D-89-F-000-60 ..... N82-34214
EPA-68-01-4655 ..... N82-33909
EPRI PROJ. 763-3 ..... N82-33895
EPRI PROJ. 1041-8 ..... N82-33870
EPRI PROJ. 1081-2 ..... N82-33877
EPRI PROJ. 1224-5 ..... N82-33898
EPRI PROJ. 1317-2 ..... N82-33851
EPRI PROJ. 1369-1 ..... N82-33897
EPRI PROJ. 1391-2 ..... N82-34298
EPRI PROJ. 1929-5 ..... N82-33508
EW-78-I-05-5750 ..... N82-33575
EX-76-C-01-2412 ..... N82-33693
EX-76-S-01-2537 ..... N82-33558
EY-76-C-06-2443 ..... N82-33847
EY-76-S-02-2948 ..... N82-33843
FAA PROJ. 045-330-130 ..... N82-33367
FAA PROJ. 181-350-320 ..... N82-33360
F04606-79-G-0082 ..... N82-33384
F04701-81-C-0082 ..... N82-33623
N82-33823
N82-33836
N82-34218
F08635-78-C-0027 ..... N82-33758
F08635-80-C-0222 ..... N82-33397
F08635-81-C-0019 ..... N82-33552
F19628-78-C-0013 ..... N82-33972
F19628-78-C-0042 ..... N82-33707
F19628-79-C-0019 ..... N82-34220
F19628-80-C-0002 ..... N82-33615
N82-34150
N82-34324
F19628-80-C-0022 ..... N82-33921
F19628-80-C-0052 ..... N82-33614
F19628-81-C-0104 ..... N82-33950
F19628-81-K-0028 ..... N82-34329
F19628-82-C-0001 ..... N82-34115
F29601-81-C-0013 ..... N82-33686
N82-33775
F30602-78-C-0120 ..... N82-34089
F30602-78-C-0148 ..... N82-34143
F30602-78-C-0287 ..... N82-33647
F30602-79-C-0099 ..... N82-33603
F30602-80-C-0171 ..... N82-34088
F30602-80-C-0184 ..... N82-33649
F30602-80-C-0252 ..... N82-34109
F30602-81-C-0104 ..... N82-33718
F30602-81-C-0249 ..... N82-34089
F33615-77-C-2020 ..... N82-33831
F33615-78-C-0523 ..... N82-34008
F33615-78-C-2024 ..... N82-33551
F33615-78-C-2058 ..... N82-33832
F33615-78-C-3609 ..... N82-33401
F33615-78-C-5096 ..... N82-33532
F33615-79-C-0519 ..... N82-34057
F33615-79-C-2051 ..... N82-34201
F33615-79-C-2059 ..... N82-33428
F33615-79-C-3212 ..... N82-33713
F33615-79-C-5020 ..... N82-33724
F33615-79-C-5025 ..... N82-33783
F33615-79-C-5034 ..... N82-33542
F33615-80-C-0004 ..... N82-34028
F33615-80-C-0513 ..... N82-33359
F33615-80-C-2063 ..... N82-33669
F33615-80-C-5029 ..... N82-33531
F33615-80-D-4001 ..... N82-33554
F33615-81-C-2056 ..... N82-33651
F33615-81-C-3619 ..... N82-34080
F40600-80-C-0006 ..... N82-33396
F49620-78-C-0027 ..... N82-33573
F49620-79-C-0038 ..... N82-34340
N82-34341
F49620-79-C-0058 ..... N82-33600
F49620-80-C-0029 ..... N82-33685
F49620-80-C-0070 ..... N82-33932
F49620-80-C-0102 ..... N82-33771
F49620-81-C-0040 ..... N82-33723
F49620-81-C-0045 ..... N82-34213
F49620-81-C-0073 ..... N82-34142
F49620-81-C-0087 ..... N82-33798
F49620-82-K-0008 ..... N82-33618
F49629-82-K-001 ..... N82-34163
F007624-79-0007 ..... N82-34020
GA PROJ. N82-33560
GIT PROJ. G36-638 ..... N82-34089
GIT PROJ. G36-643 ..... N82-34089
GIT PROJ. G36-652 ..... N82-34089
GIT PROJ. G36-654 ..... N82-34089
GIT PROJ. G36-659 ..... N82-34089
GRI-5080-342-0399 ..... N82-33577
GRI-5080-345-0375 ..... N82-33488
HUD-H-2377 ..... N82-33880
IAA-H-5481 ..... N82-33883
JPL-953733 ..... N82-34326
JPL-954012 ..... N82-34326
JPL-954013 ..... N82-34326
JPL-955335 ..... N82-33618
JPL-955336 ..... N82-33618
MDA903-78-C-0038 ..... N82-33715
MDA903-79-C-0188 ..... N82-34199
MDA903-81-C-0126 ..... N82-34091
MDA903-81-C-0151 ..... N82-34222
MDA903-81-C-0638 ..... N82-33627
MDA903-82-C-0159 ..... N82-34286
MO-A01-78-00-4092 ..... N82-33945
MO933PN N82-34012
MR0410103 ..... N82-34014
M0095PN001 ..... N82-34078
NAGW-54 ..... N82-34256
NAGW-92 ..... N82-34327
NAG1-102 ..... N82-33422
NAG1-139 ..... N82-33741
NAG1-166 ..... N82-34187
NAG1-196 ..... N82-33745
NAG1-250 ..... N82-33374
NAG2-33 ..... N82-33920
NAG2-36 ..... N82-33919
NAG3-246 ..... N82-33738
NAG5-82 ..... N82-34317
NAG5-232 ..... N82-33947
NASA ORDER A-88065-B N82-34102
NASA ORDER L-26971-B N82-33373
NASW-3204 ..... N82-34291
NASW-3504 ..... N82-34326
NASW-3506 ..... N82-33592
NAS1-14472 ..... N82-34191
NAS1-14890 ..... N82-33735
NAS1-14970 ..... N82-34187
NAS1-15080 ..... N82-33338
N82-33339
NAS1-15529 ..... N82-34050
NAS1-15859 ..... N82-33432
NAS1-16000 ..... N82-33404
NAS1-16178 ..... N82-33891
NAS1-16437 ..... N82-33431
NAS1-16759 ..... N82-34129
N82-34130
N82-34131
NAS1-16934 ..... N82-34191
NAS1-16978 ..... N82-33796
NAS2-10035 ..... N82-34066
NAS2-10061 ..... N82-33436
NAS2-10228 ..... N82-33437
NAS2-10334 ..... N82-33523
NAS2-10385 ..... N82-34061
NAS2-10430 ..... N82-34059
NAS2-10789 ..... N82-33528
NAS2-10803 ..... N82-33527
NAS3-19755 ..... N82-33392
NAS3-20629 ..... N82-33393
NAS3-20646 ..... N82-33394
NAS3-21719 ..... N82-33347
NAS3-22347 ..... N82-33375
NAS3-22525 ..... N82-33391
NAS3-22661 ..... N82-33424
N82-33425
NAS5-26417 ..... N82-33635
NAS5-26820 ..... N82-33795
NAS6-2706 ..... N82-33974
NAS7-100 ..... N82-33567
N82-33593
N82-33681
N82-34073

N82-34074
NAS8-33150 ..... N82-33948
NAS8-33524 ..... N82-33436
NAS8-33570 ..... N82-34322
NAS8-33607 ..... N82-33495
NAS8-33731 ..... N82-33430
NAS8-33974 ..... N82-33696
N82-33697
NAS8-34337 ..... N82-33698
N82-33699
NAS8-34381 ..... N82-34127
N82-34128
NAS9-15896 ..... N82-33596
NAS9-16562 ..... N82-33420
NAS9-169353 ..... N82-33979
NAS13-50 ..... N82-33539
NB-79-SBC-0086 ..... N82-34099
NCA2-OR785-210 ..... N82-33982
NCC2-34 ..... N82-34049
NCC2-67 ..... N82-34077
NCC2-102 ..... N82-34076
NGL-05-020-272 ..... N82-34327
NGL-06-003-057 ..... N82-34317
N82-34318
NGL-16-001-043 ..... N82-34326
NGL-33-018-003 ..... N82-33434
NGR-05-020-668 ..... N82-34197
NOAA-NA80-AA-D-00038 ..... N82-33591
NR PROJ. 031-824 ..... N82-33499
NR PROJ. 036-099 ..... N82-34106
NR PROJ. 041-519 ..... N82-33770
NR PROJ. 041-565 ..... N82-34136
NR PROJ. 042-280 ..... N82-34144
N82-34171
NR PROJ. 042-334 ..... N82-34181
NR PROJ. 042-479 ..... N82-34169
N82-34170
N82-34172
NR PROJ. 047-203 ..... N82-34294
NR PROJ. 048-656 ..... N82-34113
NR PROJ. 056-578 ..... N82-33466
N82-33472
N82-33473
NR PROJ. 061-272 ..... N82-33341
NR PROJ. 064-609 ..... N82-33441
N82-33780
NR PROJ. 083-004 ..... N82-34095
NR PROJ. 083-400 ..... N82-33974
NR PROJ. 201-484 ..... N82-34004
NR PROJ. 201-563 ..... N82-34005
NR PROJ. 207-037 ..... N82-34003
NR PROJ. 359-258 ..... N82-34202
NR PROJ. 379-052 ..... N82-33710
NR PROJ. 384-305 ..... N82-33538
NR PROJ. 384-309 ..... N82-33616
NR PROJ. 471 ..... N82-33499
NS-00196 ..... N82-34038
NS-12877 ..... N82-34038
NSF AST-79-16149 ..... N82-34329
NSF ATH-76-04050 ..... N82-33974
NSF ATM-76-04050-A1 ..... N82-33974
NSF ATM-77-23757 ..... N82-34334
NSF ATM-81-16989 ..... N82-34328
NSF CEE-81-11797 ..... N82-33756
NSF ECS-79-26009 ..... N82-34114
NSF ECS-80-06881 ..... N82-33618
NSF ECS-80-12608 ..... N82-33770
NSF ECS-80-12974 ..... N82-34114
NSF ENG-76-08754 ..... N82-34038
NSF ENG-78-13151 ..... N82-33664
NSF ENG-78-09365 ..... N82-34054
NSF ENG-78-10003 ..... N82-33600
NSF ENG-78-26498 ..... N82-33618
NSF ENG-7819426 ..... N82-33618
NSF MCS-79-05774 ..... N82-34152
NSF MCS-79-23110 ..... N82-34019
NSF MCS-79-24370 ..... N82-34089
NSF MCS-79-27150 ..... N82-34164
NSF MCS-80-17157 ..... N82-33678
NSF MCS-81-01631 ..... N82-33678
NSF MEA-81-12826 ..... N82-33764
NSF OCE-79-21786 ..... N82-33974
NSF PFR-77-24063 ..... N82-33546
N82-33547
NSF PFR-79-17348 ..... N82-34071
NSF PFR-79-18559 ..... N82-33581
NSF PFR-80-07389 ..... N82-33763
NSF SRS-79-11318 ..... N82-34036
NSG-1354 ..... N82-33399
NSG-1414 ..... N82-33423
NSG-1592 ..... N82-33734
NSG-1614 ..... N82-34335
NSG-2119 ..... N82-34065
NSG-2156 ..... N82-34049
NSG-2306 ..... N82-34323
NSG-3283 ..... N82-33390
NSG-5090 ..... N82-33974
NSG-5161 ..... N82-33974
NSG-7092 ..... N82-34328
N00014-75-C-0247 ..... N82-33616
N00014-75-C-0265 ..... N82-34106
N00014-75-C-0432 ..... N82-34047
N00014-75-C-0439 ..... N82-34144
N82-34171
N00014-75-C-0455 ..... N82-34165
N00014-75-C-0557 ..... N82-33538
N00014-75-C-0643 ..... N82-34019
N00014-75-C-0673 ..... N82-34327
N00014-75-C-0700 ..... N82-33974
N00014-75-C-0714 ..... N82-33976
N00014-75-C-0852 ..... N82-33929
N00014-75-C-0858 ..... N82-34293
N82-34294
N00014-75-C-0922 ..... N82-33472
N82-33473
N00014-75-C-1054 ..... N82-34181
N00014-75-C-1183 ..... N82-34151
N00014-76-C-0016 ..... N82-34326
N00014-76-C-0096 ..... N82-34292
N00014-76-C-0117 ..... N82-34194
N00014-76-C-0139 ..... N82-33762
N00014-76-C-0197 ..... N82-33974
N00014-76-C-0550 ..... N82-34140
N00014-76-C-0839 ..... N82-33336
N82-34162
N82-34163
N82-34164
N00014-76-C-1092 ..... N82-33470
N82-33471
N82-34200
N00014-76-C-01840 ..... N82-33974
N00014-77-C-0256 ..... N82-34073
N82-34111
N00014-77-C-0518 ..... N82-34177
N00014-77-C-0532 ..... N82-33770
N00014-78-C-0113 ..... N82-33970
N00014-78-C-0257 ..... N82-34053
N00014-78-C-0490 ..... N82-33341
N00014-78-C-0517 ..... N82-33618
N00014-78-C-0584 ..... N82-34195
N00014-78-C-0647 ..... N82-33441
N82-33776
N82-33777
N82-33778
N82-33780
N00014-79-C-0044 ..... N82-33503
N00014-79-C-0071 ..... N82-34095
N00014-79-C-0128 ..... N82-34003
N00014-79-C-0322 ..... N82-34180
N00014-79-C-0368 ..... N82-34113
N00014-79-C-0567 ..... N82-33499
N00014-79-C-0658 ..... N82-34032
N00014-79-C-0819 ..... N82-33986
N00014-79-C-0873 ..... N82-34089
N00014-79-F-0012 ..... N82-33536
N00014-80-C-0231 ..... N82-33535
N00014-80-C-0308 ..... N82-33702
N00014-80-C-0467 ..... N82-34034
N00014-80-C-0522 ..... N82-34031
N00014-80-C-0650 ..... N82-34090
N00014-80-C-0733 ..... N82-33541
N00014-80-C-0938 ..... N82-33642
N00014-80-K-0281 ..... N82-33729
N82-33760
N00014-80-K-0709 ..... N82-34136
N00014-81-C-0075 ..... N82-33969
N00014-81-C-0085 ..... N82-33977
N00014-81-C-0320 ..... N82-34079
N00014-81-C-0608 ..... N82-33719
N00014-81-C-2624 ..... N82-34226
N00014-81-G-0059 ..... N82-33469
N00014-81-K-0034 ..... N82-34301
N00014-81-K-0136 ..... N82-34004
N82-34013
N00014-81-K-0143 ..... N82-34096
N00014-81-K-0191 ..... N82-33770
N00014-81-K-0314 ..... N82-34026
N00014-81-K-0323 ..... N82-33645
N00014-81-K-0394 ..... N82-33650
N00014-81-K-0407 ..... N82-33725
N00014-81-K-0664 ..... N82-33652
N00014-82-C-0019 ..... N82-34095
N00014-82-C-0122 ..... N82-33688
N00014-82-C-0133 ..... N82-34005
N00014-82-C-0140 ..... N82-34277
N00014-82-C-0142 ..... N82-33710
N00014-82-C-0144 ..... N82-33505
N00014-82-C-0251 ..... N82-34232
N00014-82-C-2124 ..... N82-33837
N00014-82-F-0011 ..... N82-34198
N00014-82-K-0113 ..... N82-34202
N00014-82-K-0207 ..... N82-34167
N82-34168
N82-34169
N82-34170
N82-34172
N00014-82-K-0301 ..... N82-34112
N00014-82-MF-2001 ..... N82-34175
N00014-82-MP-2001 ..... N82-34145
N82-34146
N82-34176
N00019-78-C-0327 ..... N82-33498
N00019-79-C-0523 ..... N82-33497
N00024-76-C-5352 ..... N82-33395
N00024-78-C-5384 ..... N82-33613
N00024-79-C-6043 ..... N82-33773
N00024-79-C-6358 ..... N82-33605
N00039-80-C-0125 ..... N82-33646
N00039-81-C-0663 ..... N82-34104
N82-34105
N00173-79-C-2291 ..... N82-34262
N00173-80-C-0417 ..... N82-33500
N00600-77-C-1134 ..... N82-33774
N60530-78-C-0127 ..... N82-33427
N60530-79-M-DW93 ..... N82-33666
N60530-81-WR-30044 ..... N82-33351
N60921-81-C-0152 ..... N82-34212
N62269-79-C-0270 ..... N82-33438
N62269-81-C-0477 ..... N82-33385
N66001-78-C-0274 ..... N82-34012
N000014-75-C-0922 ..... N82-33466
PHS-HL-07374 ..... N82-34015
PHS-HL-22727 ..... N82-34015
RESEARCH PROJ. 25-2 ..... N82-33589
RF PROJ. 761119/711144 ..... N82-33467
RF11125800 ..... N82-34229
RR02102 ..... N82-34278
RR0000110 ..... N82-34178
RR0110941 ..... N82-33700
RR0130646 ..... N82-33553
RR0210542 ..... N82-33599
RR0210543 ..... N82-33607
RR0230141 ..... N82-34147
RR0320101 ..... N82-34192
RR0330244 ..... N82-33922
N82-33923
RR0420901 ..... N82-34096
RR0302244 ..... N82-33937
SB-81-975 ..... N82-33886
SF12131691 ..... N82-33622
SF32300000 ..... N82-33351
SF33326602 ..... N82-33767
SF68344601 ..... N82-34258
SG-04-7-158-44079 ..... N82-34073
SGP-2-108 ..... N82-33578
SGP-2-35208 ..... N82-33578
SWRI PROJ. 15-5676 ..... N82-33502
W-31-109-ENG-38 ..... N82-33486
N82-33487
N82-33544
N82-33670
N82-33677
N82-33987
N82-34134
W-7405-ENG-26 ..... N82-33510
N82-33512
N82-33515
N82-33849
N82-33857
N82-34117
N82-34211
N82-34214
N82-34259
N82-34271
N82-34288
W-7405-ENG-36 ..... N82-33848
N82-33863
N82-33899
N82-34126
N82-34157
N82-34210
N82-34264
N82-34273
W-7405-ENG-48 ..... N82-33444
N82-33475
N82-33482
N82-33514
N82-33675
N82-33676
N82-33838
N82-33871
N82-34272
WF31300000 ..... N82-33427
WF32300000 ..... N82-33924
WI3550000 ..... N82-33337
ZR0000101 ..... N82-33766
ZR0140201 ..... N82-33782
ZR0220101 ..... N82-33774

146-20-10-29 ..... N82-33890
151-01-70-05 ..... N82-34313
159-41-03 ..... N82-34315
199-20-42 ..... N82-33983
199-60-42-07 ..... N82-34076
199-60-62 ..... N82-33982
N82-34077
503-04-72 ..... N82-33347
505-06-51 ..... N82-33340
505-31-21 ..... N82-33663
505-31-33 ..... N82-34191
505-31-53-06 ..... N82-33342
N82-33405
505-32-2 ..... N82-33389
505-32-03-05 ..... N82-34189
505-32-03-06 ..... N82-34190
505-33-23-02 ..... N82-33737
505-33-23-05 ..... N82-33435
505-33-33-02 ..... N82-33530
505-33-53-07 ..... N82-33736
505-33-62 ..... N82-33391
505-35-21 ..... N82-33381
505-42-13-04 ..... N82-33373
N82-33734
505-42-21 ..... N82-34102
505-43-01 ..... N82-34188
506-53-12 ..... N82-33493
506-53-43-04 ..... N82-33739
506-54-73-02 ..... N82-33422
506-55-19 ..... N82-33696
N82-33697
506-62-43 ..... N82-33421
533-02-01 ..... N82-33400
534-01-13-06 ..... N82-33344
665-40-40-10 ..... N82-33918
776-33-41 ..... N82-33830
776-54-01 ..... N82-33828
776-72-41 ..... N82-33463
778-35-03 ..... N82-34311
N82-34312
778-36-06 ..... N82-33636
N82-33829
992-21-01 ..... N82-33345
992-24-01-01 ..... N82-33825
N82-33826

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-7744 ..... N82-33340* #
A-8477 ..... N82-33381* #
A-8643 ..... N82-34188* #
A-8896 ..... N82-33334* #
A-8954 ..... N82-33348* #
A-8983 ..... N82-33398* #
A-9000 ..... N82-34037* #
A-9005 ..... N82-33400* #
A-9029 ..... N82-33663* #
A-9032 ..... N82-33345* #
A-9035 ..... N82-33346* #
A-9059 ..... N82-33983* #

AAF-80-52 ..... N82-34196 #

AAP-6(P) ..... N82-34290 #

ACEE-22-FR-1603A ..... N82-33375* #

ACS-12 ..... N82-33386 #

AD-A13130 ..... N82-33769 #
AD-A106486 ..... N82-33727 #
AD-A108209 ..... N82-34336 #
AD-A110858 ..... N82-34088 #
AD-A111336 ..... N82-33561 #
AD-A111521 ..... N82-33564 #
AD-A112086 ..... N82-33637 #
AD-A113564 ..... N82-34031 #
AD-A113565 ..... N82-33974* #
AD-A113576 ..... N82-34033 #
AD-A113648 ..... N82-33975 #
AD-A113708 ..... N82-34340 #
AD-A113709 ..... N82-34341 #
AD-A113754 ..... N82-34032 #
AD-A113773 ..... N82-33801 #
AD-A113777 ..... N82-33931 #
AD-A113954 ..... N82-34084 #
AD-A114073 ..... N82-34012 #
AD-A114241 ..... N82-33932 #
AD-A114269 ..... N82-34330 #
AD-A114558 ..... N82-33408 #
AD-A114685 ..... N82-34011 #
AD-A114736 ..... N82-34010 #
AD-A114741 ..... N82-34009 #
AD-A114887 ..... N82-34008 #
AD-A114938 ..... N82-33985 #
AD-A115102 ..... N82-34015 #
AD-A115115 ..... N82-33986 #
AD-A115125 ..... N82-34016 #
AD-A115130 ..... N82-34301 #
AD-A115180 ..... N82-34017 #
AD-A115258 ..... N82-34018 #
AD-A115325 ..... N82-34035 #
AD-A115357 ..... N82-34136 #
AD-A115519 ..... N82-33976 #
AD-A115555 ..... N82-34103 #
AD-A115594 ..... N82-34029 #
AD-A115595 ..... N82-34030 #
AD-A115634 ..... N82-33665 #
AD-A115648 ..... N82-33701 #
AD-A115649 ..... N82-33335 #
AD-A115650 ..... N82-34221 #
AD-A115651 ..... N82-33569 #
AD-A115663 ..... N82-34080 #
AD-A115668 ..... N82-33601 #
AD-A115670 ..... N82-33602 #
AD-A115673 ..... N82-33973 #
AD-A115678 ..... N82-33892 #
AD-A115719 ..... N82-34192 #
AD-A115728 ..... N82-33438 #
AD-A115735 ..... N82-34132 #
AD-A115736 ..... N82-34137 #
AD-A115738 ..... N82-33598 #
AD-A115739 ..... N82-33700 #
AD-A115743 ..... N82-33366 #
AD-A115744 ..... N82-33376 #
AD-A115751 ..... N82-33597 #
AD-A115752 ..... N82-34139 #
AD-A115754 ..... N82-34138 #
AD-A115756 ..... N82-33349 #
AD-A115763 ..... N82-34002 #
AD-A115769 ..... N82-33949 #
AD-A115786 ..... N82-34181 #
AD-A115787 ..... N82-34326* #
AD-A115804 ..... N82-34140 #
AD-A115815 ..... N82-34220 #
AD-A115817 ..... N82-33467 #
AD-A115821 ..... N82-34161 #
AD-A115832 ..... N82-33921 #
AD-A115841 ..... N82-33972 #
AD-A115843 ..... N82-33832 #
AD-A115870 ..... N82-34329 #
AD-A115883 ..... N82-33640 #
AD-A115898 ..... N82-34078 #
AD-A115904 ..... N82-34007 #
AD-A115911 ..... N82-33800 #
AD-A115926 ..... N82-33365 #
AD-A115937 ..... N82-33702 #
AD-A115940 ..... N82-34026 #
AD-A115956 ..... N82-33831 #
AD-A115972 ..... N82-33797 #
AD-A115993 ..... N82-33406 #
AD-A115994 ..... N82-33639 #
AD-A115995 ..... N82-33414 #
AD-A116003 ..... N82-33600 #
AD-A116026 ..... N82-33382 #
AD-A116045 ..... N82-34079 #
AD-A116047 ..... N82-34219 #
AD-A116053 ..... N82-34183* #
AD-A116054 ..... N82-33599 #
AD-A116055 ..... N82-33638 #
AD-A116299 ..... N82-34106 #
AD-A116440 ..... N82-34003 #
AD-A116499 ..... N82-34004 #
AD-A116502 ..... N82-34104 #
AD-A116503 ..... N82-34105 #
AD-A116510 ..... N82-34028 #
AD-A116607 ..... N82-34005 #
AD-A116608 ..... N82-34006 #
AD-A116657 ..... N82-33984 #
AD-A116765 ..... N82-33714 #
AD-A116766 ..... N82-33928 #
AD-A116767 ..... N82-34095 #
AD-A116768 ..... N82-33799 #
AD-A116770 ..... N82-33687 #
AD-A116771 ..... N82-33952 #
AD-A116786 ..... N82-33535 #
AD-A116788 ..... N82-34339 #
AD-A116794 ..... N82-33925 #
AD-A116797 ..... N82-33606 #
AD-A116798 ..... N82-34092 #
AD-A116799 ..... N82-33924 #
AD-A116800 ..... N82-34278 #
AD-A116801 ..... N82-33666 #
AD-A116811 ..... N82-34108 #
AD-A116813 ..... N82-34162 #
AD-A116814 ..... N82-34163 #
AD-A116823 ..... N82-34090 #
AD-A116829 ..... N82-33534 #
AD-A116831 ..... N82-33337 #
AD-A116832 ..... N82-33533 #
AD-A116837 ..... N82-33614 #
AD-A116838 ..... N82-33613 #
AD-A116842 ..... N82-33893 #
AD-A116846 ..... N82-33336 #
AD-A116848 ..... N82-33922 #
AD-A116853 ..... N82-33384 #
AD-A116856 ..... N82-34082 #
AD-A116857 ..... N82-33532 #
AD-A116859 ..... N82-33603 #
AD-A116860 ..... N82-34143 #
AD-A116861 ..... N82-34277 #
AD-A116866 ..... N82-33355 #
AD-A116867 ..... N82-34148 #
AD-A116868 ..... N82-33766 #
AD-A116873 ..... N82-33358 #
AD-A116878 ..... N82-33396 #
AD-A116880 ..... N82-33605 #
AD-A116881 ..... N82-34107 #
AD-A116886 ..... N82-34013 #
AD-A116888 ..... N82-34164 #
AD-A116890 ..... N82-34150 #
AD-A116891 ..... N82-33970 #
AD-A116893 ..... N82-34222 #
AD-A116894 ..... N82-33416 #
AD-A116896 ..... N82-34027 #
AD-A116904 ..... N82-33415 #
AD-A116907 ..... N82-34184 #
AD-A116912 ..... N82-34111 #
AD-A116913 ..... N82-33667 #
AD-A116915 ..... N82-34034 #
AD-A116929 ..... N82-34292 #
AD-A116932 ..... N82-34294 #
AD-A116933 ..... N82-33469 #
AD-A116936 ..... N82-33950 #
AD-A116937 ..... N82-33707 #
AD-A116939 ..... N82-33926 #
AD-A116940 ..... N82-33686 #
AD-A116941 ..... N82-33934 #
AD-A116942 ..... N82-34144 #
AD-A116943 ..... N82-34171 #
AD-A116944 ..... N82-34172 #
AD-A116948 ..... N82-33498 #
AD-A116949 ..... N82-33604 #
AD-A116952 ..... N82-33612 #
AD-A116955 ..... N82-34089 #
AD-A116959 ..... N82-33770 #
AD-A116960 ..... N82-34014 #
AD-A116966 ..... N82-33497 #
AD-A116967 ..... N82-33607 #
AD-A116968 ..... N82-33704 #
AD-A116980 ..... N82-34109 #
AD-A116982 ..... N82-33927 #
AD-A116992 ..... N82-33771 #
AD-A116999 ..... N82-34212 #
AD-A117000 ..... N82-33642 #
AD-A117012 ..... N82-33643 #
AD-A117016 ..... N82-34081 #
AD-A117019 ..... N82-33350 #
AD-A117022 ..... N82-34167 #
AD-A117023 ..... N82-34168 #
AD-A117025 ..... N82-34226 #
AD-A117026 ..... N82-33684 #
AD-A117029 ..... N82-34182 #
AD-A117032 ..... N82-34149 #
AD-A117034 ..... N82-33767 #
AD-A117040 ..... N82-33352 #
AD-A117048 ..... N82-34193 #
AD-A117049 ..... N82-34110 #
AD-A117052 ..... N82-33685 #
AD-A117061 ..... N82-34165 #
AD-A117071 ..... N82-34145 #
AD-A117072 ..... N82-34176 #
AD-A117073 ..... N82-34146 #
AD-A117075 ..... N82-33668 #
AD-A117076 ..... N82-33798 #
AD-A117078 ..... N82-34142 #
AD-A117080 ..... N82-33549 #
AD-A117084 ..... N82-33835 #
AD-A117085 ..... N82-34177 #
AD-A117088 ..... N82-33395 #
AD-A117089 ..... N82-34135 #
AD-A117092 ..... N82-34166 #
AD-A117100 ..... N82-34093 #
AD-A117103 ..... N82-33356 #
AD-A117106 ..... N82-33833 #

AD-A117107 ..... N82-33608 #
AD-A117110 ..... N82-34147 #
AD-A117111 ..... N82-34141 #
AD-A117112 ..... N82-34094 #
AD-A117113 ..... N82-34173 #
AD-A117141 ..... N82-33407 #
AD-A117142 ..... N82-33439 #
AD-A117147 ..... N82-33951 #
AD-A117151 ..... N82-34091 #
AD-A117153 ..... N82-33971 #
AD-A117155 ..... N82-33499 #
AD-A117156 ..... N82-34083 #
AD-A117157 ..... N82-33953 #
AD-A117158 ..... N82-33548 #
AD-A117159 ..... N82-33706 #
AD-A117160 ..... N82-34225 #
AD-A117161 ..... N82-33611 #
AD-A117162 ..... N82-33705 #
AD-A117231 ..... N82-34169 #
AD-A117232 ..... N82-34170 #
AD-A117233 ..... N82-34295 #
AD-A117238 ..... N82-33641 #
AD-A117243 ..... N82-33531 #
AD-A117244 ..... N82-33401 #
AD-A117245 ..... N82-33688 #
AD-A117247 ..... N82-34198 #
AD-A117263 ..... N82-34175 #
AD-A117264 ..... N82-33723 #
AD-A117266 ..... N82-34174 #
AD-A117267 ..... N82-34293 #
AD-A117268 ..... N82-33351 #
AD-A117269 ..... N82-33923 #
AD-A117278 ..... N82-33929 #
AD-A117284 ..... N82-33768 #
AD-A117286 ..... N82-33969 #
AD-A117288 ..... N82-33383 #
AD-A117292 ..... N82-33440 #
AD-A117295 ..... N82-33468 #
AD-A117301 ..... N82-33703 #
AD-A117305 ..... N82-33609 #
AD-A117306 ..... N82-33834 #
AD-A117307 ..... N82-33644 #
AD-A117310 ..... N82-34223 #
AD-A117311 ..... N82-33354 #
AD-A117313 ..... N82-33353 #
AD-A117325 ..... N82-33930 #
AD-A117342 ..... N82-33713 #
AD-A117346 ..... N82-34224 #
AD-A117350 ..... N82-33610 #
AD-A117352 ..... N82-33571 #
AD-A117363 ..... N82-33570 #
AD-A117364 ..... N82-33615 #
AD-A117370 ..... N82-33616 #
AD-A117371 ..... N82-33617 #
AD-A117374 ..... N82-33977 #
AD-A117387 ..... N82-33772 #
AD-A117388 ..... N82-33536 #
AD-A117390 ..... N82-34152 #
AD-A117394 ..... N82-33706 #
AD-A117397 ..... N82-33357 #
AD-A117399 ..... N82-33620 #
AD-A117400 ..... N82-33621 #
AD-A117401 ..... N82-34279 #
AD-A117408 ..... N82-33550 #
AD-A117409 ..... N82-33802 #
AD-A117415 ..... N82-33622 #
AD-A117416 ..... N82-33538 #
AD-A117419 ..... N82-33623 #
AD-A117424 ..... N82-34227 #
AD-A117426 ..... N82-34228 #
AD-A117433 ..... N82-34280 #
AD-A117435 ..... N82-34229 #
AD-A117438 ..... N82-33551 #
AD-A117441 ..... N82-33471 #
AD-A117442 ..... N82-34200 #
AD-A117443 ..... N82-33470 #
AD-A117445 ..... N82-33367 #
AD-A117447 ..... N82-33954 #
AD-A117450 ..... N82-34112 #
AD-A117451 ..... N82-33502 #
AD-A117452 ..... N82-33955 #
AD-A117456 ..... N82-33572 #
AD-A117457 ..... N82-33956 #
AD-A117458 ..... N82-33537 #
AD-A117459 ..... N82-33646 #
AD-A117460 ..... N82-34153 #
AD-A117461 ..... N82-34113 #
AD-A117485 ..... N82-33540 #
AD-A117486 ..... N82-33387 #
AD-A117492 ..... N82-33780 #
AD-A117493 ..... N82-34154 #
AD-A117494 ..... N82-34283 #
AD-A117495 ..... N82-33429 #
AD-A117496 ..... N82-33539* #
AD-A117498 ..... N82-33804 #
AD-A117503 ..... N82-33715 #
AD-A117504 ..... N82-33624 #
AD-A117505 ..... N82-33779 #
AD-A117506 ..... N82-33689 #
AD-A117507 ..... N82-34282 #
AD-A117510 ..... N82-33803 #
AD-A117516 ..... N82-34180 #
AD-A117524 ..... N82-34286 #
AD-A117525 ..... N82-33652 #
AD-A117547 ..... N82-33377 #
AD-A117552 ..... N82-33359 #
AD-A117567 ..... N82-33645 #
AD-A117569 ..... N82-33410 #
AD-A117570 ..... N82-33933 #
AD-A117572 ..... N82-33409 #
AD-A117585 ..... N82-33397 #
AD-A117589 ..... N82-33501 #
AD-A117594 ..... N82-33649 #
AD-A117598 ..... N82-33718 #
AD-A117604 ..... N82-33426 #
AD-A117607 ..... N82-34114 #
AD-A117608 ..... N82-34019 #
AD-A117609 ..... N82-33647 #
AD-A117611 ..... N82-34178 #
AD-A117622 ..... N82-33773 #
AD-A117626 ..... N82-33618 #
AD-A117629 ..... N82-33360 #
AD-A117631 ..... N82-33774 #
AD-A117640 ..... N82-33368 #
AD-A117641 ..... N82-34324 #
AD-A117643 ..... N82-34302 #
AD-A117647 ..... N82-34115 #
AD-A117651 ..... N82-33427 #
AD-A117659 ..... N82-33935 #
AD-A117660 ..... N82-34096 #
AD-A117664 ..... N82-33369 #
AD-A117666 ..... N82-33619 #
AD-A117668 ..... N82-33669 #
AD-A117671 ..... N82-33362 #
AD-A117672 ..... N82-34201 #
AD-A117673 ..... N82-33629 #
AD-A117674 ..... N82-33783 #
AD-A117680 ..... N82-34202 #
AD-A117682 ..... N82-33978 #
AD-A117683 ..... N82-33958 #
AD-A117684 ..... N82-33837 #
AD-A117687 ..... N82-33380 #
AD-A117689 ..... N82-33938 #
AD-A117691 ..... N82-33370 #
AD-A117695 ..... N82-33555 #
AD-A117696 ..... N82-33653 #
AD-A117701 ..... N82-34156 #
AD-A117702 ..... N82-33719 #
AD-A117710 ..... N82-33784 #
AD-A117711 ..... N82-34213 #
AD-A117713 ..... N82-33782 #
AD-A117714 ..... N82-34155 #
AD-A117715 ..... N82-34290 #
AD-A117718 ..... N82-34179 #
AD-A117719 ..... N82-34297 #
AD-A117720 ..... N82-33690 #
AD-A117721 ..... N82-33627 #
AD-A117722 ..... N82-34233 #
AD-A117723 ..... N82-33628 #
AD-A117728 ..... N82-34133 #
AD-A117729 ..... N82-34285 #
AD-A117731 ..... N82-33443 #
AD-A117732 ..... N82-33651 #
AD-A117742 ..... N82-33500 #
AD-A117752 ..... N82-34199 #
AD-A117808 ..... N82-34151 #
AD-A117814 ..... N82-33541 #
AD-A117815 ..... N82-33402 #
AD-A117836 ..... N82-34232 #
AD-A117839 ..... N82-33957 #
AD-A117841 ..... N82-33724 #
AD-A117844 ..... N82-33894 #
AD-A117845 ..... N82-33504 #
AD-A117847 ..... N82-34194 #
AD-A117849 ..... N82-33553 #
AD-A117851 ..... N82-33936 #
AD-A117853 ..... N82-33716 #
AD-A117854 ..... N82-33717 #
AD-A117862 ..... N82-34257 #
AD-A117864 ..... N82-34021 #
AD-A117865 ..... N82-33725 #
AD-A117873 ..... N82-33648 #
AD-A117875 ..... N82-33554 #
AD-A117876 ..... N82-33388 #
AD-A117877 ..... N82-33379 #
AD-A117884 ..... N82-34284 #
AD-A117887 ..... N82-33650 #
AD-A117888 ..... N82-33486 #
AD-A117890 ..... N82-33473 #
AD-A117891 ..... N82-33472 #
AD-A117896 ..... N82-33625 #
AD-A117897 ..... N82-34085 #
AD-A117898 ..... N82-33626 #
AD-A117899 ..... N82-33710 #
AD-A117900 ..... N82-34258 #
AD-A117901 ..... N82-33505 #
AD-A117902 ..... N82-33442 #
AD-A117903 ..... N82-33781 #
AD-A117904 ..... N82-33542 #
AD-A117905 ..... N82-33361 #
AD-A117907 ..... N82-34195 #
AD-A117908 ..... N82-33937 #
AD-A117909 ..... N82-33364* #
AD-A117912 ..... N82-33836 #
AD-A117915 ..... N82-34097 #
AD-A117916 ..... N82-34230 #
AD-A117917 ..... N82-34087 #
AD-A117918 ..... N82-34231 #
AD-A117919 ..... N82-33386 #
AD-A117921 ..... N82-34020 #
AD-A117922 ..... N82-34281 #
AD-A117925 ..... N82-33775 #
AD-A117926 ..... N82-33428 #
AD-A117928 ..... N82-33552 #
AD-A117933 ..... N82-33378 #
AD-A117935 ..... N82-34296 #
AD-A117938 ..... N82-33709 #
AD-A117940 ..... N82-34303 #
AD-A117942 ..... N82-33776 #
AD-A117944 ..... N82-33777 #
AD-A117945 ..... N82-33778 #
AD-A117946 ..... N82-33441 #
AD-A117947 ..... N82-33503 #
AD-A117948 ..... N82-33385 #
AD-A118573 ..... N82-33526 #

AD-B067129 ..... N82-34250 #

AD-E400809 ..... N82-33380 #
AD-E400863 ..... N82-33643 #
AD-E400867 ..... N82-33539* #
AD-E410545 ..... N82-33985 #

AD-F300051 ..... N82-34148 #
AD-F300053 ..... N82-33355 #
AD-F500038 ..... N82-33415 #
AD-F500046 ..... N82-33409 #

ADL-36011 ..... N82-33839 #
ADL-83670-35 ..... N82-33893 #

AEDC-TR-82-16 ..... N82-33396 #

AER-482 ..... N82-33887 #

AES-13609 ..... N82-33651 #

AFAMRL-TR-81-5 ..... N82-34006 #
AFAMRL-TR-81-71 ..... N82-33359 #
AFAMRL-TR-82-21 ..... N82-34002 #
AFAMRL-TR-82-39 ..... N82-34020 #

AFESC/ESL-TR-81-11 ..... N82-33835 #
AFESC/ESL-TR-81-45 ..... N82-33408 #
AFESC/ESL-TR-81-46 ..... N82-33397 #
AFESC/ESL-TR-82-01 ..... N82-33554 #
AFESC/ESL-TR-82-06 ..... N82-33552 #

AFGL-TR-82-0103 ..... N82-34220 #
AFGL-TR-82-0114 ..... N82-33972 #
AFGL-TR-82-0117 ..... N82-34329 #
AFGL-TR-82-0118 ..... N82-33921 #
AFGL-TR-82-0124 ..... N82-33950 #
AFGL-TR-82-0139 ..... N82-33707 #
AFGL-TR-82-0163 ..... N82-33934 #

AFHRL-TP-81-46 ..... N82-34028 #
AFHRL-TP-82-14 ..... N82-34295 #

AFIT/GCS/MA-82M-3 ..... N82-34103 #

AFLRL-145 ..... N82-33550 #
AFLRL-152 ..... N82-33526 #

AFMD-82-66 ..... N82-33403 #

AFOSR-82-0197TR ..... N82-33930 #
AFOSR-82-0227TR-VOL-1 ..... N82-34340 #
AFOSR-82-0228TR-VOL-2 ..... N82-34341 #
AFOSR-82-0351TR ..... N82-33932 #
AFOSR-82-0352TR ..... N82-34330 #
AFOSR-82-0420TR ..... N82-34016 #
AFOSR-82-0441TR ..... N82-34035 #
AFOSR-82-0476TR ..... N82-33600 #
AFOSR-82-0485TR ..... N82-33689 #
AFOSR-82-0487TR ..... N82-34007 #
AFOSR-82-0514TR ..... N82-33668 #
AFOSR-82-0517TR ..... N82-33549 #

AFOSR-82-0529TR ..... N82-34182 #
AFOSR-82-0531TR ..... N82-34166 #
AFOSR-82-0532TR ..... N82-33625 #
AFOSR-82-0534TR ..... N82-34149 #
AFOSR-82-0543TR ..... N82-34193 #
AFOSR-82-0545TR ..... N82-34081 #
AFOSR-82-0547TR ..... N82-33771 #
AFOSR-82-0548TR ..... N82-33504 #
AFOSR-82-0549TR ..... N82-33798 #
AFOSR-82-0551TR ..... N82-33709 #
AFOSR-82-0553TR ..... N82-34094 #
AFOSR-82-0556TR ..... N82-34141 #
AFOSR-82-0557TR ..... N82-34154 #
AFOSR-82-0558TR ..... N82-34152 #
AFOSR-82-0559TR ..... N82-34110 #
AFOSR-82-0566TR ..... N82-33685 #
AFOSR-82-0568TR ..... N82-33723 #
AFOSR-82-0571TR ..... N82-34213 #
AFOSR-82-0575TR ..... N82-33402 #
AFOSR-82-0576TR ..... N82-34142 #
AFOSR-82-0578TR ..... N82-33628 #
AFOSR-82-0580TR ..... N82-34233 #
AFOSR-82-0581TR ..... N82-34285 #
AFOSR-82-0583TR ..... N82-34133 #
AFOSR-82-0592TR ..... N82-34257 #
AFOSR-82-0610TR ..... N82-34281 #
AFOSR-82-0618TR ..... N82-34284 #

AFWAL-TR-81-2086-VOL-1 ..... N82-33669 #
AFWAL-TR-81-3154-VOL-1 ..... N82-33713 #
AFWAL-TR-81-3175 ..... N82-34080 #
AFWAL-TR-81-4038 ..... N82-33724 #
AFWAL-TR-81-4092 ..... N82-33542 #
AFWAL-TR-81-4136 ..... N82-33534 #
AFWAL-TR-82-2001 ..... N82-33428 #
AFWAL-TR-82-2003 ..... N82-33832 #
AFWAL-TR-82-2013 ..... N82-33831 #
AFWAL-TR-82-2024 ..... N82-33651 #
AFWAL-TR-82-2029 ..... N82-34201 #
AFWAL-TR-82-2087-PT-5 ..... N82-33551 #
AFWAL-TR-82-3035 ..... N82-33401 #
AFWAL-TR-82-4013 ..... N82-33442 #
AFWAL-TR-82-4014 ..... N82-33781 #
AFWAL-TR-82-4015 ..... N82-33783 #
AFWAL-TR-82-4023 ..... N82-33532 #
AFWAL-TR-82-4046 ..... N82-33531 #

AFWL-TR-81-147 ..... N82-33686 #
AFWL-TR-82-9 ..... N82-33775 #

AGARD-309(B16) ..... N82-33464 #

AI-M-675 ..... N82-34019 #

AIPR-1 ..... N82-34281 #

AMI-008 ..... N82-34286 #

AMS-220 ..... N82-33371 #

ANL-82-7 ..... N82-33544 #
ANL-82-8 ..... N82-34134 #

ANL/CEN/FE-80-18 ..... N82-33670 #

ANL/FE-81-65 ..... N82-33487 #

ANL/OEPM-82-2 ..... N82-33486 #

ANL/OTEC-BCM-026 ..... N82-33987 #

ANL/OTEC-PS-11 ..... N82-33677 #

AR-1 ..... N82-34142 #
AR-2 ..... N82-33504 #
AR-002-887 ..... N82-33690 #

ARBRL-MR-03183 ..... N82-34148 #
ARBRL-MR-03184 ..... N82-33355 #

ARCSL-TR-81094 ..... N82-33985 #

ARL-MAT-TM-382 ..... N82-33690 #

ARL-TM-82-10 ..... N82-33605 #

ARL-TR-82-30 ..... N82-33970 #
ARL-TR-82-32 ..... N82-34194 #

ARL/PSU/TR-82-131 ..... N82-33773 #

ARLCB-TR-82016 ..... N82-33439 #

ARLCD-CR-82033 ..... N82-33539* #

ARMID-TR-82001 ..... N82-33643 #

ARO-10993.3-PH ..... N82-33502 #
ARO-13061.3-PH ..... N82-33502 #
ARO-14907.2-PH ..... N82-33572 #
ARO-15242.10-EL ..... N82-34184 #
ARO-15420.14-GS ..... N82-33956 #
ARO-15611.9-C ..... N82-33467 #
ARO-16005.3-EG ..... N82-33537 #
ARO-16669.16-M ..... N82-33931 #
ARO-16713.18-MA ..... N82-34161 #
ARO-16713.20-MA ..... N82-34155 #
ARO-16758.1-EL-A ..... N82-34108 #
ARO-16992.12-MA ..... N82-34153 #
ARO-17610.1-MA-H ..... N82-33867 #
ARO-17664.4-EL ..... N82-34184 #
ARO-17689.2-EG ..... N82-33779 #
ARO-18054.1-EL ..... N82-33624 #
ARO-18424.7-MA ..... N82-34114 #
ARO-167387.4-PH ..... N82-33502 #

ARTSD-TR-81005 ..... N82-33380 #

AS-133 ..... N82-33965 #

ASE-4700 ..... N82-34213 #

AS132 ..... N82-33967 #

AVRADCOM-TR-82-A-13 ..... N82-33345* #

B-206887 ..... N82-33403 #
B-207165 ..... N82-34307 #

BATT-G-7818-0001 ..... N82-33719 #

BDM/A-82-276-TR ..... N82-34222 #

BDX-613-2650 ..... N82-33785 #
BDX-613-2700 ..... N82-33657 #
BDX-613-2763 ..... N82-33513 #
BDX-613-2770 ..... N82-33711 #

BM-OFR-16-82 ..... N82-34086 #
BM-OFR-17-82 ..... N82-33812 #

BM-RI-8586 ..... N82-33810 #
BM-RI-8595 ..... N82-33809 #
BM-RI-8596 ..... N82-33808 #
BM-RI-8597 ..... N82-33582 #
BM-RI-8605 ..... N82-33518 #
BM-RI-8624 ..... N82-33519 #

BNL-30895 ..... N82-33477 #
BNL-51465 ..... N82-34203 #
BNL-51507 ..... N82-34266 #
BNL-51509 ..... N82-34022 #

BR84018 ..... N82-33464 #

C-686 ..... N82-33710 #
C-687 ..... N82-34005 #

CELSS-16 ..... N82-34077* #

CERC-CETA-81-17 ..... N82-33975 #

CERL-TM-P-130 ..... N82-34179 #

CERL-TR-M-316 ..... N82-33629 #

CGR/DC-5/82 ..... N82-34087 #
CGR/DC-6/82 ..... N82-34230 #

CMS-02-81 ..... N82-33976 #

CMU-036-099-14 ..... N82-34106 #

CO-ONR-005 ..... N82-34031 #

CONCAWE-1/81 ..... N82-33908 #
CONCAWE-2/81 ..... N82-34025 #
CONCAWE-4/80 ..... N82-33905 #
CONCAWE-7/80 ..... N82-33906 #

CONF-810865-12 ..... N82-33838 #
CONF-820345-12 ..... N82-34269 #
CONF-820519-2 ..... N82-33477 #

CRREL-SR-81-34 ..... N82-33801 #
CRREL-SR-82-11 ..... N82-33957 #
CRREL-SR-82-13 ..... N82-33648 #

CS-1982-4 ..... N82-34154 #

CSIE-82-6 ..... N82-34096 #

CU-1533143 ..... N82-34257 #

CUED/A-TURBO/TR-110 ..... N82-33343 #
CUED/A-TURBO/TR-111 ..... N82-33662 #
CUED/A-TURBO/TR-112 ..... N82-33661 #

CUED/C-MATS/TR-44 ..... N82-33578 #
CUED/C-MATS/TR-72-1980 ..... N82-33447 #
CUED/C-MATS/TR-84-1981 ..... N82-33448 #
CUED/C-MATS/TR-85-1981 ..... N82-33445 #
CUED/C-MATS/TR-88-1981 ..... N82-33574 #

CUED/D-STRUCT/TR-85-1980 ..... N82-33720 #

CUED/F-CAMS/TR-204-1980 ..... N82-34158 #
CUED/F-CAMS/TR-217-1981-PT-1 ..... N82-34160 #
CUED/F-CAMS/TR-218-1981 ..... N82-34159 #

DDA-EDR-10671 ..... N82-33669 #

DE82-001830 ..... N82-34214 #
DE82-002454 ..... N82-33873 #
DE82-003134 ..... N82-33556 #
DE82-005539 ..... N82-33805 #
DE82-005658 ..... N82-33485 #
DE82-007245 ..... N82-34259 #
DE82-007957 ..... N82-33506 #
DE82-007984 ..... N82-34215 #
DE82-008076 ..... N82-33959 #
DE82-008086 ..... N82-33987 #
DE82-008102 ..... N82-34260 #
DE82-008137 ..... N82-33559 #
DE82-008211 ..... N82-33482 #
DE82-008345 ..... N82-33877 #
DE82-008367 ..... N82-34205 #
DE82-008447 ..... N82-33481 #
DE82-008475 ..... N82-33854 #
DE82-008483 ..... N82-33846 #
DE82-008508 ..... N82-33490 #
DE82-008568 ..... N82-33479 #
DE82-008622 ..... N82-33679 #
DE82-008713 ..... N82-33676 #
DE82-008775 ..... N82-33711 #
DE82-008777 ..... N82-34261 #
DE82-008852 ..... N82-34266 #
DE82-008931 ..... N82-34267 #
DE82-008933 ..... N82-34274 #
DE82-008934 ..... N82-34275 #
DE82-008936 ..... N82-34276 #
DE82-008960 ..... N82-34264 #
DE82-008973 ..... N82-33655 #
DE82-009031 ..... N82-34288 #
DE82-009058 ..... N82-33691 #
DE82-009067 ..... N82-34126 #
DE82-009083 ..... N82-33848 #
DE82-009085 ..... N82-34262 #
DE82-009093 ..... N82-33477 #
DE82-009106 ..... N82-33654 #
DE82-009124 ..... N82-33847 #
DE82-009172 ..... N82-33843 #
DE82-009280 ..... N82-33476 #
DE82-009288 ..... N82-33850 #
DE82-009289 ..... N82-33673 #
DE82-009301 ..... N82-34265 #
DE82-009319 ..... N82-33942 #
DE82-009398 ..... N82-33842 #
DE82-009404 ..... N82-33675 #
DE82-009475 ..... N82-33844 #
DE82-009476 ..... N82-33981 #
DE82-009504 ..... N82-33853 #
DE82-009553 ..... N82-34287 #
DE82-009606 ..... N82-33849 #
DE82-009638 ..... N82-33806 #
DE82-009652 ..... N82-34208 #
DE82-009653 ..... N82-33483 #
DE82-009723 ..... N82-33840 #
DE82-009818 ..... N82-34118 #
DE82-009911 ..... N82-33478 #
DE82-009962 ..... N82-34273 #
DE82-009964 ..... N82-34157 #
DE82-009971 ..... N82-34304 #
DE82-009996 ..... N82-33899 #
DE82-010168 ..... N82-33838 #
DE82-010204 ..... N82-33670 #
DE82-010291 ..... N82-33671 #
DE82-010376 ..... N82-33839 #
DE82-010614 ..... N82-33507 #
DE82-010717 ..... N82-33678 #
DE82-010867 ..... N82-33866 #
DE82-011031 ..... N82-33674 #
DE82-011104 ..... N82-33475 #
DE82-011255 ..... N82-34206 #
DE82-011425 ..... N82-34203 #
DE82-011591 ..... N82-34185 #
DE82-011687 ..... N82-33861 #
DE82-011712 ..... N82-33543 #
DE82-011721 ..... N82-33474 #
DE82-011863 ..... N82-33509 #

DE82-011866 ..... N82-33896 #
DE82-011939 ..... N82-33845 #
DE82-012013 ..... N82-33692 #
DE82-012198 ..... N82-33856 #
DE82-012312 ..... N82-33660 #
DE82-012339 ..... N82-33852 #
DE82-012464 ..... N82-33693 #
DE82-012517 ..... N82-33517 #
DE82-012557 ..... N82-34263 #
DE82-012567 ..... N82-34216 #
DE82-012571 ..... N82-33874 #
DE82-012595 ..... N82-33544 #
DE82-012724 ..... N82-33658 #
DE82-012866 ..... N82-33514 #
DE82-012873 ..... N82-33656 #
DE82-012880 ..... N82-33962 #
DE82-012882 ..... N82-33513 #
DE82-012996 ..... N82-33484 #
DE82-013040 ..... N82-33511 #
DE82-013263 ..... N82-33941 #
DE82-013272 ..... N82-33862 #
DE82-013322 ..... N82-33516 #
DE82-013420 ..... N82-33860 #
DE82-013431 ..... N82-33876 #
DE82-013525 ..... N82-33786 #
DE82-013529 ..... N82-33510 #
DE82-013631 ..... N82-33859 #
DE82-013692 ..... N82-34134 #
DE82-013809 ..... N82-33855 #
DE82-014245 ..... N82-34022 #
DE82-014247 ..... N82-33858 #
DE82-014275 ..... N82-34209 #
DE82-014385 ..... N82-34270 #
DE82-014389 ..... N82-33900 #
DE82-014390 ..... N82-33901 #
DE82-014392 ..... N82-34269 #
DE82-014405 ..... N82-34268 #
DE82-014426 ..... N82-33677 #
DE82-014441 ..... N82-33871 #
DE82-014512 ..... N82-33659 #
DE82-014516 ..... N82-33867 #
DE82-014570 ..... N82-33512 #
DE82-014571 ..... N82-34117 #
DE82-014584 ..... N82-33557 #
DE82-014632 ..... N82-34098 #
DE82-014656 ..... N82-33857 #
DE82-014875 ..... N82-33444 #
DE82-014903 ..... N82-33487 #
DE82-014909 ..... N82-33486 #
DE82-014956 ..... N82-34272 #
DE82-015005 ..... N82-33558 #
DE82-015027 ..... N82-33872 #
DE82-015028 ..... N82-33875 #
DE82-015080 ..... N82-34210 #
DE82-015082 ..... N82-33863 #
DE82-015158 ..... N82-33865 #
DE82-015215 ..... N82-33869 #
DE82-015235 ..... N82-34271 #
DE82-015494 ..... N82-34116 #
DE82-015495 ..... N82-33630 #
DE82-015501 ..... N82-33939 #
DE82-015503 ..... N82-34217 #
DE82-015717 ..... N82-33545 #
DE82-015762 ..... N82-33940 #
DE82-016027 ..... N82-33868 #
DE82-016028 ..... N82-33657 #
DE82-016029 ..... N82-33785 #
DE82-016032 ..... N82-33878 #
DE82-016036 ..... N82-33515 #
DE82-016042 ..... N82-34211 #
DE82-700020 ..... N82-34204 #
DE82-700448 ..... N82-33726 #
DE82-700785 ..... N82-34289 #
DE82-701020 ..... N82-34207 #
DE82-780258 ..... N82-33672 #
DE82-900742 ..... N82-33841 #
DE82-901847 ..... N82-33897 #
DE82-902070 ..... N82-33508 #
DE82-902073 ..... N82-33851 #
DE82-902223 ..... N82-33895 #
DE82-903152 ..... N82-33864 #
DE82-903666 ..... N82-34296 #
DE82-903667 ..... N82-33870 #
DE82-903730 ..... N82-33898 #

DIAL/EE-81-005 ..... N82-34233 #

DISCUSSION-PAPER-623 ..... N82-34177 #

DOE/CS-20239/1 ..... N82-33850 #
DOE/CS-40076/T1 ..... N82-33873 #
DOE/CS-40210/T2 ..... N82-33545 #

DOE/ER-0119 ..... N82-34260 #
DOE/ER-0122 ..... N82-34265 #
DOE/ER-00946/5 ..... N82-34206 #
DOE/ER-02078/7 ..... N82-34215 #
DOE/ER-03077/174 ..... N82-33678 #
DOE/ER-04946/4 ..... N82-33509 #
DOE/ER-10406/T3 ..... N82-33474 #
DOE/ER-10417/1 ..... N82-33654 #
DOE/ER-10421.12 ..... N82-33543 #
DOE/ER-10459/28 ..... N82-34185 #
DOE/ER-10473/1 ..... N82-34098 #
DOE/ER-10521/T1 ..... N82-34304 #
DOE/ER-10942/1 ..... N82-33506 #
DOE/ER-10956/1 ..... N82-34287 #
DOE/ER-70004/317 ..... N82-34205 #

DOE/ET-5054/1 ..... N82-33877 #
DOE/ET-10104/50 ..... N82-33481 #
DOE/ET-10374/199 ..... N82-33693 #
DOE/ET-10589/T1 ..... N82-33558 #
DOE/ET-11028/1164 ..... N82-33484 #
DOE/ET-12056/32 ..... N82-33862 #
DOE/ET-15457/1111 ..... N82-33516 #
DOE/ET-15611/T3 ..... N82-33869 #
DOE/ET-20242/78-1 ..... N82-33847 #
DOE/ET-20242/81/2 ..... N82-33691 #
DOE/ET-20279/192 ..... N82-33868 #
DOE/ET-29044/1 ..... N82-33655 #
DOE/ET-29064/1 ..... N82-33659 #
DOE/ET-33011/T1 ..... N82-34208 #
DOE/ET-51013/31 ..... N82-34118 #
DOE/ET-51013/42 ..... N82-34269 #
DOE/ET-53016/77 ..... N82-34270 #
DOE/ET-53042/35 ..... N82-34262 #
DOE/ET-53051/27 ..... N82-34263 #
DOE/ET-60035/T3 ..... N82-33839 #

DOE/EV-10725/1 ..... N82-33896 #

DOE/FE-05122/T1 ..... N82-33485 #

DOE/GJ-01664/T3 ..... N82-33941 #

DOE/MC-11284/T11 ..... N82-33671 #
DOE/MC-14584/1193-VOL-1 ..... N82-33557 #
DOE/MC-14591/T1 ..... N82-33480 #

DOE/NASA/0032-16-VOL-1 ..... N82-34311* #
DOE/NASA/0032-18-VOL-3 ..... N82-34312* #
DOE/NASA/0109-1 ..... N82-33494* #
DOE/NASA/0145-1 ..... N82-33827* #
DOE/NASA/12726-17 ..... N82-33463* #
DOE/NASA/20320-41 ..... N82-33830* #
DOE/NASA/51044-25 ..... N82-33829* #
DOE/NASA/51044-28 ..... N82-33636* #

DOE/NBB-0002 ..... N82-33874 #

DOE/NBM-2014441 ..... N82-33871 #
DOE/NBM-2015158 ..... N82-33865 #

DOE/NV-10171/1 ..... N82-34216 #

DOE/OR-03055/T2 ..... N82-33483 #

DOE/PC-10350/T1 ..... N82-33476 #

DOE/PETC/TR-82/7 ..... N82-33479 #
DOE/PETC/TR-82/8 ..... N82-33692 #

DOE/RA-50157/T1 ..... N82-33658 #
DOE/RA-50158/T1 ..... N82-33660 #
DOE/RA-50313/1137 ..... N82-33559 #

DOE/RL-00600/T1 ..... N82-33876 #

DOE/SF-11485/T1-VOL-2 ..... N82-33878 #
DOE/SF-11485/1 ..... N82-33845 #

DOE/TIC-11600-VOL-1 ..... N82-34267 #
DOE/TIC-11600-VOL-3 ..... N82-34274 #
DOE/TIC-11600-VOL-4 ..... N82-34275 #
DOE/TIC-11600-VOL-5 ..... N82-34276 #

DOI/DF-82-001A ..... N82-33943 #

DOT/FAA/ACS-82-15 ..... N82-33362 #

DOT/FAA/CT-82/35 ..... N82-34033 #
DOT/FAA/CT-82/46 ..... N82-33619 #

DOT/FAA/RD-81/75 ..... N82-33619 #
DOT/FAA/RD-82/26 ..... N82-33388 #
DOT/FAA/RD-82/29 ..... N82-33368 #
DOT/FAA/RD-82/46 ..... N82-34085 #

DP-1609 ..... N82-33458 #

DRXRO-PP-L-15420-GS ..... N82-33956 #
DRXTH-TE-CR-82165 ..... N82-34302 #

DT-8203-01 ..... N82-33668 #

DTNSRDC-82/050 ..... N82-33766 #
DTNSRDC-82/051 ..... N82-33774 #

DTNSRDC/CMLD-82/17 ..... N82-33782 #

DTNSRDC/SPD-0695-02 ..... N82-33570 #

D6-51464 ..... N82-33388 #

E-559 ..... N82-33389* #
E-989-81-04 ..... N82-34001* #
E-1232 ..... N82-33636* #
E-1283 ..... N82-33829* #
E-1298 ..... N82-33493* #
E-1305 ..... N82-33828 #
E-1318 ..... N82-33463* #
E-1346 ..... N82-33830* #

ECRC/M-1483 ..... N82-33576 #

EDA-82-0020 ..... N82-33885 #

EGG-FM-5657 ..... N82-33507 #

EGG-GTH-5573 ..... N82-33856 #
EGG-GTH-5812 ..... N82-33855 #

EGG-2135 ..... N82-33682 #

EM-80-1 ..... N82-33612 #

EOARD-TR-82-12 ..... N82-33938 #

EPA-AA-SDSB-82-3 ..... N82-33489 #
EPA-AA-SDSB-82-7 ..... N82-33491 #
EPA-AA-SDSB-82-8 ..... N82-33490 #

EPA-600/6-82-001 ..... N82-33904 #
EPA-600/6-82-002 ..... N82-33909 #
EPA-908/1-81-002 ..... N82-33910 #

EPL-82-1/ONR-82-1 ..... N82-34032 #

EPRI-CS-2075 ..... N82-33895 #

EPRI-EA-2217 ..... N82-33897 #
EPRI-EA-2231 ..... N82-33851 #
EPRI-EA-2364 ..... N82-33898 #

EPRI-EM-2210-VOL-1 ..... N82-33877 #
EPRI-EM-2272-SR ..... N82-33864 #
EPRI-EM-2387 ..... N82-33870 #

EPRI-NP-2166 ..... N82-34298 #
EPRI-NP-2237 ..... N82-33508 #

ERADCOM/ASL-CR-82-0206-1 ..... N82-33802 #

ERIM-160700-1-F ..... N82-33795* #

ESD-TR-82-035 ..... N82-33615 #
ESD-TR-82-046 ..... N82-34150 #
ESD-TR-82-050 ..... N82-34324 #
ESD-TR-82-134 ..... N82-34115 #

ETL-R036 ..... N82-33928 #

ETL-0275 ..... N82-33687 #
ETL-0280 ..... N82-33799 #
ETL-0287 ..... N82-33952 #
ETL-0294 ..... N82-34107 #

E82-10292 ..... N82-33792* #
E82-10294 ..... N82-33793* #

FAA-AM-82-4 ..... N82-34009 #

FAA-CT-81-17 ..... N82-33370 #
FAA-CT-81-69-VOL-1 ..... N82-33361 #
FAA-CT-82-55 ..... N82-33360 #
FAA-CT-82-57 ..... N82-33367 #

FAA-EM-82-22 ..... N82-33369 #

FAA-RD-81-47 ..... N82-33370 #
FAA-RD-82-31 ..... N82-33954 #

FAA-8101 ..... N82-33894 #

FCR-3522-2 ..... N82-33881 #

FCTC-81-30 ..... N82-34120 #

FCTC-81-33 ..... N82-34124 #
FCTC-81-100 ..... N82-34120 #
FCTC-81-100 ..... N82-34122 #
FCTC-81-101 ..... N82-34123 #
FCTC-81-102 ..... N82-34121 #
FCTC-81-103 ..... N82-34124 #
FCTC-81-103 ..... N82-34125 #
FCTC-81-107 ..... N82-34100 #

FDA-82-8158 ..... N82-33694 #

FDA/BRH-82/59 ..... N82-33694 #

FESA-T-2110 ..... N82-33835 #

FHWA/CA/SD-81/05 ..... N82-33587 #

FHWA/CT/RD-847-2-81-14 ..... N82-33590 #

FHWA/NJ-82/003 ..... N82-33580 #

FHWA/NY/RR-81/91 ..... N82-33589 #

FHWA/RD-81/148 ..... N82-33788 #

FHWA/SD-80-618 ..... N82-33579 #

FHWA/VA-82/31 ..... N82-33588 #

FNAL-TM-1098 ..... N82-34209 #

FR-1 ..... N82-33667 #

FSF-ATC-1142-1-82U ..... N82-33366 #

FSU-STATISTICS-M628 ..... N82-34161 #
FSU-STATISTICS-M634 ..... N82-34155 #

FTD-ID(RS)T-0139-81 ..... N82-33602 #
FTD-ID(RS)T-0167-82 ..... N82-33637 #
FTD-ID(RS)T-0181-82 ..... N82-33665 #
FTD-ID(RS)T-0202-82 ..... N82-33377 #
FTD-ID(RS)T-0300-82 ..... N82-33335 #
FTD-ID(RS)T-0356-82 ..... N82-33701 #
FTD-ID(RS)T-0455-82 ..... N82-33601 #
FTD-ID(RS)T-0522-82 ..... N82-33429 #
FTD-ID(RS)T-0588-82 ..... N82-33406 #
FTD-ID(RS)T-0644-82 ..... N82-33639 #
FTD-ID(RS)T-0782-82 ..... N82-33933 #
FTD-ID(RS)T-1209-81 ..... N82-34221 #
FTD-ID(RS)T-1448-81 ..... N82-33410 #
FTD-ID(RS)T-1464-80-VOL-1 ..... N82-33569 #
FTD-ID(RS)T-1988-80 ..... N82-33414 #

FUB-7-1982 ..... N82-34119 #

GA-A16300 ..... N82-33560 #

GA/PLRD-82-74 ..... N82-34296 #

GC-TR-82-184 ..... N82-33500 #
GC-TR-82-288 ..... N82-33837 #

GC-81-2 ..... N82-33941 #

GIT/EES-A-2291 ..... N82-34282 #

GJBX-11-82 ..... N82-33806 #
GJBX-406-81-VOL-1 ..... N82-33805 #

GPO-85-343 ..... N82-34309 #
GPO-87-365 ..... N82-33889 #
GPO-87-473 ..... N82-33595 #
GPO-89-006 ..... N82-34308 #
GPO-90-289 ..... N82-33412 #
GPO-93-418 ..... N82-34306 #
GPO-96-894 ..... N82-33418 #

GRI-80/0105 ..... N82-33560 #
GRI-81/0019 ..... N82-33488 #
GRI-81/0038 ..... N82-33881 #
GRI-81/0041 ..... N82-33807 #
GRI-82/0001 ..... N82-33577 #

GUUS-08825 ..... N82-34195 #

GWU-IIST-82-04 ..... N82-34304 #

G82-0023-7 ..... N82-33824* #

H-REPT-97-398 ..... N82-33595 #
H-REPT-97-897 ..... N82-34308 #

HARL-ONR-8103 ..... N82-34301 #

HDL-CR-82-116-1 ..... N82-33617 #

HDL-TR-1990 ..... N82-34283 #

HEDL-TME-81-52 ..... N82-33517 #

HHI-81-462 ..... N82-33716 #

HPR-647 ..... N82-33590 #

HUD-16 ..... N82-33381* #
HUD-0002338 ..... N82-33880 #

IDR-60D ..... N82-33547 #

IFUSP-P232 ..... N82-34204 #

IIHR-238 ..... N82-33680 #

INDU/DC/TR-82/3-MC ..... N82-33503 #

INPE-2335-PRE/082 ..... N82-33794* #
INPE-2430-PRE/134 ..... N82-33793* #
INPE-2431-PRE/135 ..... N82-33792* #

INSTAAR-1-11-81-00549 ..... N82-33966 #

IPL-TR-027 ..... N82-34112 #

IPPJ-AM-22 ..... N82-34234 #

IPPJ-575 ..... N82-34235 #
IPPJ-576 ..... N82-34247 #
IPPJ-580 ..... N82-34236 #
IPPJ-581 ..... N82-34248 #
IPPJ-582 ..... N82-34249 #
IPPJ-583 ..... N82-34237 #
IPPJ-584 ..... N82-34250 #
IPPJ-585 ..... N82-34251 #
IPPJ-586 ..... N82-34252 #
IPPJ-587 ..... N82-34238 #
IPPJ-588 ..... N82-34245 #
IPPJ-589 ..... N82-34244 #
IPPJ-590 ..... N82-34239 #
IPPJ-591 ..... N82-34243 #
IPPJ-592 ..... N82-34242 #
IPPJ-593 ..... N82-34241 #
IPPJ-595 ..... N82-34246 #
IPPJ-597 ..... N82-34240 #
IPPJ-598 ..... N82-34253 #
IPPJ-600 ..... N82-34254 #
IPPJ-601 ..... N82-34255 #

IR-4 ..... N82-33386 #
IR-4 ..... N82-33589 #

ISBN-0-11-884135-1 ..... N82-33815 #
ISBN-0-11-884140-8 ..... N82-33816 #
ISBN-0-11-884158-0 ..... N82-33811 #
ISBN-0-11-884164-5 ..... N82-33817 #
ISBN-0-309-03186-9 ..... N82-33903 #
ISBN-951-38-0779-7 ..... N82-33584 #
ISBN-951-38-0935-8 ..... N82-33787 #
ISBN-951-38-0965-X ..... N82-33583 #
ISBN-951-38-1111-5 ..... N82-33585 #
ISBN-951-38-1201-4 ..... N82-33722 #
ISBN-951-38-1202-2 ..... N82-33721 #

ISSN-0077-5606 ..... N82-33461 #
ISSN-0077-5606 ..... N82-33462 #
ISSN-0077-5606 ..... N82-33465 #
ISSN-0077-5606 ..... N82-33529 #
ISSN-0077-5606 ..... N82-33980 #
ISSN-0077-5606 ..... N82-34101 #
ISSN-0085-4301 ..... N82-33460 #
ISSN-0309-765X ..... N82-34158 #
ISSN-0309-765X ..... N82-34159 #
ISSN-0309-765X ..... N82-34160 #
ISSN-0309-6505 ..... N82-33445 #
ISSN-0309-6505 ..... N82-33446 #
ISSN-0309-6505 ..... N82-33447 #
ISSN-0309-6505 ..... N82-33574 #
ISSN-0309-6505 ..... N82-33578 #
ISSN-0309-6521 ..... N82-33343 #
ISSN-0309-6521 ..... N82-33661 #
ISSN-0309-6521 ..... N82-33662 #
ISSN-0309-7447 ..... N82-33720 #
ISSN-0355-337X ..... N82-33787 #
ISSN-0355-6395 ..... N82-33584 #
ISSN-0355-6395 ..... N82-33721 #
ISSN-0355-6395 ..... N82-33722 #
ISSN-0357-3737 ..... N82-33585 #
ISSN-1305-1315 ..... N82-33586 #
ISSN-035506395 ..... N82-33583 #

ITEK-82-8466.1 ..... N82-33420* #

ITR-1 ..... N82-33738* #

ITT-82-24-02 ..... N82-34226 #

JINR-E-1-81-436 ..... N82-34207 #

JPRS-81775 ..... N82-33988 #

JSC-17625-VOL-1 ..... N82-33594* #

J206-82-001/6204 ..... N82-33977 #

K-78-22 ..... N82-33581 #

KAERI/RR-262/80 ..... N82-33726 #

KFK-3163 ..... N82-33672 #

KU-HCOE-FL2-R-80-10 ..... N82-33841 #

L-15127 ..... N82-33421* #
L-15307 ..... N82-34189* #
L-15316 ..... N82-34190* #
L-15335 ..... N82-33405* #
L-15370 ..... N82-33342* #
L-15432 ..... N82-33918* #
L-15506 ..... N82-33739* #

LA-8796-MS ..... N82-34157 #
LA-9040 ..... N82-34264 #
LA-9074-MS ..... N82-34273 #
LA-9208-PR ..... N82-33848 #
LA-9233-MS ..... N82-33899 #
LA-9257-MS ..... N82-34126 #
LA-9295-HDE ..... N82-33863 #
LA-9306-MS ..... N82-34210 #

LAIR-82-33TN ..... N82-34018 #

LBL-13234 ..... N82-33838 #
LBL-13324 ..... N82-33852 #
LBL-13707 ..... N82-33475 #

LC-81-4727 ..... N82-33809 #
LC-81-83977 ..... N82-33903 #
LC-81-600174 ..... N82-34099 #
LC-81-607055 ..... N82-33808 #
LC-81-607827 ..... N82-33582 #
LC-81-607853 ..... N82-33810 #

LCDS-82-3 ..... N82-34152 #

LIDS-FR-1188 ..... N82-34182 #

LIDS-P-1175 ..... N82-34151 #
LIDS-P-1192 ..... N82-33770 #

LIR/12-81/1 ..... N82-33882 #
LIR/12-81/5 ..... N82-33902 #

LJI-R-82-195 ..... N82-33628 #

LMF-89 ..... N82-33901 #
LMF-90 ..... N82-33900 #

LMSC-HREC-TR-D784744-PT-1 ..... N82-33696* #
LMSC-HREC-TR-D784744-PT-2 ..... N82-33697* #

LPN-OSURF-761119/711144 ..... N82-33467 #

M-491-203-82-05 ..... N82-33413* #

MANPA-NR-470(82) ..... N82-33426 #

MAP-23 ..... N82-33591 #

MASAD-82-33 ..... N82-34307 #

MASEC-SCR-81-091 ..... N82-33860 #

MCR-82-581-VOL-1 ..... N82-34129* #
MCR-82-581-VOL-2-PT-1-APP-A ..... N82-34130* #
MCR-82-581-VOL-2-PT-2-APP-B ..... N82-34131* #
MCR-82-581-VOL-2-PT-2-APP-C ..... N82-34131* #
MCR-82-581-VOL-2-PT-2-APP-D ..... N82-34131* #
MCR-82-581-VOL-2-PT-2-APP-E ..... N82-34131* #

MDC-Q0762 ..... N82-34212 #

MIMEO-SER-1389 ..... N82-34140 #

MIT-EL-81-025 ..... N82-33884 #
MIT-EL-81-028 ..... N82-33859 #
MIT-EL-82-005 ..... N82-33866 #

MIT-R81-5 ..... N82-33524* #

MMC-81/06 ..... N82-33907 #

MRDC41083.18TR ..... N82-34091 #

MRL-R-851 ..... N82-33653 #

MRL-TN-457 ..... N82-33555 #

MSSU-EIRS-EE-82-3 ..... N82-34322* #

MTI-80ASE142DR1-VOL-1 ..... N82-34311* #

MTR-8224 ..... N82-34115 #

M010-8205-10-PT-1 ..... N82-341[illegible] #
M010-8205-11-PT-2 ..... N82-34 #

NA-80-871 ..... N82-33359 #

NADC-79056-60 ..... N82-33438 #
NADC-81105-50 ..... N82-33385 #
NADC-82074-60 ..... N82-34082 #
NADC-82093-60 ..... N82-33337 #
NADC-82147-60 ..... N82-33382 #

NAE-LR-609 ..... N82-33350 #

NAMRL-1281 ..... N82-34011 #

NAS 1.15:76975 ..... N82-33433* #
NAS 1.15:78564 ..... N82-33340* #
NAS 1.15:82477 ..... N82-33411* #
NAS 1.15:82491 ..... N82-34315* #
NAS 1.15:82494 ..... N82-33683* #
NAS 1.15:82863 ..... N82-33636* #
NAS 1.15:82900 ..... N82-33829* #
NAS 1.15:82913 ..... N82-33463* #
NAS 1.15:82917 ..... N82-33828 #
NAS 1.15:82933 ..... N82-33493* #
NAS 1.15:82944 ..... N82-33830* #
NAS 1.15:83189 ..... N82-33890* #
NAS 1.15:83240 ..... N82-33825* #
NAS 1.15:83242 ..... N82-33826* #
NAS 1.15:83265 ..... N82-33981* #
NAS 1.15:83276 ..... N82-33736* #
NAS 1.15:83819 ..... N82-34319* #
NAS 1.15:83946 ..... N82-34314* #
NAS 1.15:83956 ..... N82-33946* #
NAS 1.15:83971 ..... N82-33947* #
NAS 1.15:83991 ..... N82-33824* #
NAS 1.15:83994 ..... N82-34325* #
NAS 1.15:84219 ..... N82-34188* #
NAS 1.15:84225 ..... N82-33398* #
NAS 1.15:84238 ..... N82-33334* #
NAS 1.15:84257 ..... N82-33348* #
NAS 1.15:84273 ..... N82-34037* #
NAS 1.15:84278 ..... N82-33663* #
NAS 1.15:84280 ..... N82-33345* #
NAS 1.15:84282 ..... N82-33400* #
NAS 1.15:84283 ..... N82-33346* #
NAS 1.15:84285 ..... N82-33983* #
NAS 1.15:84474 ..... N82-33405* #
NAS 1.15:84502 ..... N82-34300* #
NAS 1.15:84506 ..... N82-34191* #
NAS 1.15:84516 ..... N82-33530* #
NAS 1.15:84518 ..... N82-33344* #
NAS 1.15:84520 ..... N82-33342* #
NAS 1.15:84525 ..... N82-33737* #
NAS 1.15:84533 ..... N82-33733* #
NAS 1.15:84535 ..... N82-33435* #
NAS 1.15:84721 ..... N82-33364* #
NAS 1.15:84853 ..... N82-33594* #
NAS 1.15:84854 ..... N82-34001* #
NAS 1.15:84857 ..... N82-33413* #
NAS 1.15:84858 ..... N82-34186* #
NAS 1.19:179 ..... N82-33789* #
NAS 1.21:7011(235) ..... N82-33995* #
NAS 1.26 ..... N82-33635* #
NAS 1.26:3593 ..... N82-34313* #
NAS 1.26:3594 ..... N82-33459* #
NAS 1.26:3600 ..... N82-33373* #
NAS 1.26:3603 ..... N82-33735* #
NAS 1.26:3614 ..... N82-33432* #
NAS 1.26:3616 ..... N82-33431* #
NAS 1.26:3618 ..... N82-34335* #
NAS 1.26:3619 ..... N82-33734 #
NAS 1.26:162079 ..... N82-34127* #
NAS 1.26:162081 ..... N82-34128* #
NAS 1.26:162087 ..... N82-33699* #
NAS 1.26:162089 ..... N82-33496* #
NAS 1.26:162090 ..... N82-34322* #
NAS 1.26:165481 ..... N82-33827* #
NAS 1.26:165557 ..... N82-33393* #
NAS 1.26:165810 ..... N82-34187* #
NAS 1.26:165886 ..... N82-33891* #
NAS 1.26:165917 ..... N82-33404* #
NAS 1.26:165967 ..... N82-33796* #
NAS 1.26:165975 ..... N82-34129* #
NAS 1.26:165976 ..... N82-34130* #
NAS 1.26:165977 ..... N82-34131* #
NAS 1.26:166383 ..... N82-34077* #
NAS 1.26:166384 ..... N82-34076* #
NAS 1.26:166394 ..... N82-33982* #
NAS 1.26:166405 ..... N82-33436* #
NAS 1.26:166407 ..... N82-33437* #
NAS 1.26:166413 ..... N82-33527* #
NAS 1.26:166414 ..... N82-33528* #
NAS 1.26:167629 ..... N82-33420* #
NAS 1.26:167726 ..... N82-33596* #
NAS 1.26:167889-VOL-1 ..... N82-33424* #
NAS 1.26:167889-VOL-2 ..... N82-33425* #
NAS 1.26:167895 ..... N82-33375* #
NAS 1.26:167914 ..... N82-33392* #
NAS 1.26:167935 ..... N82-34311* #
NAS 1.26:167937 ..... N82-34312* #
NAS 1.26:167944 ..... N82-33390* #
NAS 1.26:167949 ..... N82-33391* #
NAS 1.26:167984 ..... N82-33347* #
NAS 1.26:167996 ..... N82-33394* #
NAS 1.26:169198 ..... N82-33592* #
NAS 1.26:169229 ..... N82-34183* #
NAS 1.26:169231 ..... N82-34326* #
NAS 1.26:169335 ..... N82-33792* #
NAS 1.26:169336 ..... N82-33793* #
NAS 1.26:169344 ..... N82-33338* #
NAS 1.26:169345 ..... N82-33339* #
NAS 1.26:169345 ..... N82-33434* #
NAS 1.26:169347 ..... N82-34327* #
NAS 1.26:169349 ..... N82-34316* #
NAS 1.26:169350 ..... N82-33524* #
NAS 1.26:169351 ..... N82-34317* #
NAS 1.26:169352 ..... N82-33374* #
NAS 1.26:169353 ..... N82-33979* #
NAS 1.26:169355 ..... N82-33525* #
NAS 1.26:169356 ..... N82-34318* #
NAS 1.26:169357 ..... N82-34291* #
NAS 1.26:169358 ..... N82-33738* #
NAS 1.26:169359 ..... N82-34256* #
NAS 1.26:169360 ..... N82-33423* #
NAS 1.26:169361 ..... N82-33399* #
NAS 1.26:169374 ..... N82-33539* #
NAS 1.26:169375 ..... N82-33974* #
NAS 1.26:169379 ..... N82-34320* #
NAS 1.26:169379 ..... N82-34328* #
NAS 1.26:169416 ..... N82-34197* #
NAS 1.26:169417 ..... N82-33920* #
NAS 1.26:169418 ..... N82-34323* #
NAS 1.26:169419 ..... N82-33422* #
NAS 1.26:169420 ..... N82-33919* #
NAS 1.26:169852 ..... N82-33494* #
NAS 1.26:170446 ..... N82-33795* #
NAS 1.26:170622 ..... N82-33698* #
NAS 1.26:170623 ..... N82-33948* #
NAS 1.26:170624 ..... N82-33430* #
NAS 1.26:170625 ..... N82-33696* #
NAS 1.26:170626 ..... N82-33697* #
NAS 1.26:170627 ..... N82-33495* #
NAS 1.55:2245 ..... N82-33739* #
NAS 1.60:1815 ..... N82-33381* #
NAS 1.60:2049 ..... N82-33389* #
NAS 1.60:2065 ..... N82-33421* #
NAS 1.60:2069 ..... N82-33417* #
NAS 1.60:2072 ..... N82-34189* #
NAS 1.60:2075 ..... N82-34[illegible]90* #
NAS 1.60:2077 ..... N82-33918* #

NASA-CASE-ARC-14408-1 ..... N82-33523* #

NASA-CASE-KSC-11097-1 ..... N82-33520*

NASA-CASE-LAR-12738-1 ..... N82-33419* #
NASA-CASE-LAR-12843-1 ..... N82-33372* #

NASA-CASE-LEW-13028-1 ..... N82-33521*
NASA-CASE-LEW-13639-1 ..... N82-33522* #

NASA-CASE-MFS-15670-1 ..... N82-33634* #
NASA-CASE-MFS-15791-1 ..... N82-33712* #

NASA-CASE-NPO-14549-2 ..... N82-33996*
NASA-CASE-NPO-15070-1 ..... N82-33567* #
NASA-CASE-NPO-15617-1 ..... N82-33681* #
NASA-CASE-NPO-15920-1 ..... N82-33593* #

NASA-CP-2245 ..... N82-33739* #

NASA-CR-3593 ..... N82-34313* #
NASA-CR-3594 ..... N82-33459* #
NASA-CR-3600 ..... N82-33373* #
NASA-CR-3603 ..... N82-33735* #
NASA-CR-3615 ..... N82-33432* #
NASA-CR-3616 ..... N82-33431* #
NASA-CR-3618 ..... N82-34335* #
NASA-CR-3619 ..... N82-33734 #
NASA-CR-162079 ..... N82-34127* #
NASA-CR-162081 ..... N82-34128* #
NASA-CR-162087 ..... N82-33699* #
NASA-CR-162089 ..... N82-33496* #
NASA-CR-162090 ..... N82-34322* #
NASA-CR-165481 ..... N82-33827* #
NASA-CR-165557 ..... N82-33393* #
NASA-CR-165810 ..... N82-34187* #
NASA-CR-165886 ..... N82-33891* #
NASA-CR-165917 ..... N82-33404* #
NASA-CR-165967 ..... N82-33796* #
NASA-CR-165975 ..... N82-34129* #
NASA-CR-165976 ..... N82-34130* #
NASA-CR-165977 ..... N82-34131* #
NASA-CR-166383 ..... N82-34077* #
NASA-CR-166384 ..... N82-34076* #
NASA-CR-166394 ..... N82-33982* #
NASA-CR-166405 ..... N82-33436* #
NASA-CR-166407 ..... N82-33437* #
NASA-CR-166413 ..... N82-33527* #
NASA-CR-166414 ..... N82-33528* #
NASA-CR-167397 ..... N82-34312* #
NASA-CR-167629 ..... N82-33420* #
NASA-CR-167726 ..... N82-33596* #
NASA-CR-167889-VOL-1 ..... N82-33424* #
NASA-CR-167889-VOL-2 ..... N82-33425* #
NASA-CR-167895 ..... N82-33375* #
NASA-CR-167914 ..... N82-33392* #
NASA-CR-167935 ..... N82-34311* #
NASA-CR-167944 ..... N82-33390* #
NASA-CR-167949 ..... N82-33391* #
NASA-CR-167984 ..... N82-33347* #
NASA-CR-167996 ..... N82-33394* #
NASA-CR-169198 ..... N82-33592* #
NASA-CR-169229 ..... N82-34183* #
NASA-CR-169231 ..... N82-34326* #
NASA-CR-169325 ..... N82-33794* #
NASA-CR-169335 ..... N82-33792* #
NASA-CR-169336 ..... N82-33793* #
NASA-CR-169344 ..... N82-33338* #
NASA-CR-169345 ..... N82-33339* #
NASA-CR-169345 ..... N82-33434* #
NASA-CR-169347 ..... N82-34327* #
NASA-CR-169349 ..... N82-34316* #
NASA-CR-169350 ..... N82-33524* #
NASA-CR-169351 ..... N82-34317* #
NASA-CR-169352 ..... N82-33374* #
NASA-CR-169353 ..... N82-33979* #
NASA-CR-169355 ..... N82-33525* #
NASA-CR-169356 ..... N82-34318* #
NASA-CR-169357 ..... N82-34291* #
NASA-CR-169358 ..... N82-33738* #
NASA-CR-169359 ..... N82-34256* #
NASA-CR-169360 ..... N82-33423* #
NASA-CR-169361 ..... N82-33399* #
NASA-CR-169374 ..... N82-33539* #
NASA-CR-169375 ..... N82-33974* #
NASA-CR-169379 ..... N82-34320* #
NASA-CR-169379 ..... N82-34328* #
NASA-CR-169416 ..... N82-34197* #
NASA-CR-169417 ..... N82-33920* #
NASA-CR-169418 ..... N82-34323* #
NASA-CR-169419 ..... N82-33422* #
NASA-CR-169420 ..... N82-33919* #
NASA-CR-169852 ..... N82-33494* #
NASA-CR-170445 ..... N82-33635* #
NASA-CR-170446 ..... N82-33795* #
NASA-CR-170622 ..... N82-33698* #
NASA-CR-170623 ..... N82-33948* #
NASA-CR-170624 ..... N82-33430* #
NASA-CR-170625 ..... N82-33696* #
NASA-CR-170626 ..... N82-33697* #
NASA-CR-170627 ..... N82-33495* #

NASA-EP-179 ..... N82-33789* #

NASA-SP-7011(235) ..... N82-33995* #

NASA-TM-76975 ..... N82-33433* #
NASA-TM-78584 ..... N82-33340* #
NASA-TM-82477 ..... N82-33411* #
NASA-TM-82491 ..... N82-34315* #
NASA-TM-82494 ..... N82-33683* #
NASA-TM-82863 ..... N82-33636* #
NASA-TM-82900 ..... N82-33829* #
NASA-TM-82913 ..... N82-33463* #
NASA-TM-82917 ..... N82-33828 #
NASA-TM-82933 ..... N82-33493* #
NASA-TM-82944 ..... N82-33830* #
NASA-TM-83189 ..... N82-33890* #
NASA-TM-83240 ..... N82-33825* #
NASA-TM-83242 ..... N82-33826* #
NASA-TM-83265 ..... N82-33981* #
NASA-TM-83276 ..... N82-33736* #
NASA-TM-83819 ..... N82-34319* #
NASA-TM-83946 ..... N82-34314* #

NASA-TM-83956 ..... N82-33946* #
NASA-TM-83971 ..... N82-33947* #
NASA-TM-83991 ..... N82-33824* #
NASA-TM-83994 ..... N82-34325* #
NASA-TM-84219 ..... N82-34188* #
NASA-TM-84225 ..... N82-33398* #
NASA-TM-84238 ..... N82-33334* #
NASA-TM-84257 ..... N82-33348* #
NASA-TM-84273 ..... N82-34037* #
NASA-TM-84278 ..... N82-33663* #
NASA-TM-84280 ..... N82-33345* #
NASA-TM-84282 ..... N82-33400* #
NASA-TM-84283 ..... N82-33346* #
NASA-TM-84285 ..... N82-33983* #
NASA-TM-84474 ..... N82-33405* #
NASA-TM-84502 ..... N82-34300* #
NASA-TM-84506 ..... N82-34191* #
NASA-TM-84516 ..... N82-33530* #
NASA-TM-84518 ..... N82-33344* #
NASA-TM-84520 ..... N82-33342* #
NASA-TM-84525 ..... N82-33737* #
NASA-TM-84533 ..... N82-33733* #
NASA-TM-84535 ..... N82-33435* #
NASA-TM-84721 ..... N82-33364* #
NASA-TM-84853 ..... N82-33594* #
NASA-TM-84854 ..... N82-34001* #
NASA-TM-84857 ..... N82-33413* #
NASA-TM-84858 ..... N82-34186* #

NASA-TP-1815 ..... N82-33381* #
NASA-TP-2049 ..... N82-33389* #
NASA-TP-2065 ..... N82-33421* #
NASA-TP-2069 ..... N82-33417* #
NASA-TP-2072 ..... N82-34189* #
NASA-TP-2075 ..... N82-34190* #
NASA-TP-2077 ..... N82-33918* #

NAVHLTHRSCHC-82-2 ..... N82-34014 #

NAVTRAEQUIPC-IH-335 ..... N82-33407 #

NBDL-81R011 ..... N82-34084 #

NBS-GCR-81-356 ..... N82-33632 #

NBS-SP-500-86 ..... N82-34099 #

NBSIR-81-2369 ..... N82-33883 #
NBSIR-81-2372 ..... N82-33575 #
NBSIR-82-1660 ..... N82-33679 #
NBSIR-82-2451 ..... N82-34023 #

NCAR/TN-188 ..... N82-34334 #

NCO-TR-285 ..... N82-33971 #

NCS-TIB-82-2 ..... N82-33684 #

NDRC/PUBL-82/1002 ..... N82-33695 #

NDRE-376-VM-159 ..... N82-33460 #

NDRE/PUBL-81/1003 ..... N82-33460 #

NEAR-TR-263 ..... N82-33341 #

NMAB-382 ..... N82-33646 #
NMAB-387 ..... N82-33715 #

NMERI-TA-8-9 ..... N82-33775 #

NMERI-TA10-6 ..... N82-33686 #

NOAA-TM-ERL-OWRM-8 ..... N82-33963 #
NOAA-TM-ERL-OWRM-9 ..... N82-33964 #

NOAA-TM-ERL-WPL-85 ..... N82-33631 #

NOAA-TM-NWS-WR-172 ..... N82-33960 #

NOAA-81012003 ..... N82-33945 #
NOAA-81121501-PT-1 ..... N82-34331 #
NOAA-81122902 ..... N82-33631 #
NOAA-81122906 ..... N82-33964 #
NOAA-81122907 ..... N82-33963 #
NOAA-82011201 ..... N82-33960 #
NOAA-82012004-PT-1 ..... N82-34332 #
NOAA-82012005-PT-2 ..... N82-34333 #
NOAA-82012008 ..... N82-33944 #
NOAA-82032213 ..... N82-33591 #

NOSC/TD-469 ..... N82-33626 #

NOSC/TR-691 ..... N82-34012 #
NOSC/TR-774 ..... N82-33767 #
NOSC/TR-778 ..... N82-33936 #

NPRDC-SR-82-29 ..... N82-34297 #

NPS52-82-007 ..... N82-34097 #
NPS55-82-008 ..... N82-34137 #
NPS55-82-017 ..... N82-34178 #
NPS61-82-005 ..... N82-34192 #
NPS63-82-004CR ..... N82-34232 #
NPS69-82-002 ..... N82-33351 #
NPS69-82-003 ..... N82-33352 #

NRC-20225 ..... N82-33350 #

NRC/CNR-TT-2023 ..... N82-33465 #
NRC/CNR-TT-2024 ..... N82-33462 #
NRC/CNR-TT-2026 ..... N82-33529 #
NRC/CNR-TT-2029 ..... N82-33461 #
NRC/CNR-TT-2030 ..... N82-34101 #
NRC/CNR-TT-2031 ..... N82-33980 #

NRL-MR-4791 ..... N82-33700 #
NRL-MR-4808 ..... N82-34229 #
NRL-MR-4820 ..... N82-33704 #
NRL-MR-4824 ..... N82-34183* #
NRL-MR-4830 ..... N82-33935 #
NRL-MR-4839 ..... N82-33922 #
NRL-MR-4852 ..... N82-34147 #
NRL-MR-4858 ..... N82-33937 #
NRL-MR-4862 ..... N82-33923 #
NRL-MR-4866 ..... N82-33553 #
NRL-MR-4869 ..... N82-34258 #

NRL-8583 ..... N82-33599 #
NRL-8603 ..... N82-33607 #
NRL-8604 ..... N82-33598 #
NRL-8608 ..... N82-33364* #
NRL-34838 ..... N82-33638 #

NSF/CEE-81080 ..... N82-33581 #
NSF/CEE-81083 ..... N82-33547 #
NSF/CEE-81084 ..... N82-33548 #

NSMRL-982-PT-3 ..... N82-34078 #

NSWC-TR-81-234 ..... N82-33797 #
NSWC-TR-457 ..... N82-33415 #

NSWC/TR-82-32 ..... N82-33409 #
NSWC/TR-82-143 ..... N82-33416 #

NTIA-CR-81-15-VOL-6-NO-1 ..... N82-34024 #

NTIA-82-92 ..... N82-33633 #

NUSC-TD-6735 ..... N82-33978 #

NUSC-TR-6659 ..... N82-34156 #

NWC-TP-6205 ..... N82-33925 #
NWC-TP-6292 ..... N82-33924 #
NWC-TP-6302 ..... N82-33666 #
NWC-TP-6305 ..... N82-33427 #
NWC-TP-6323 ..... N82-34278 #
NWC-TP-6353 ..... N82-33533 #

OITS-173 ..... N82-34205 #

ONWI-310 ..... N82-33940 #

OPD-TR-82-257-01 ..... N82-33969 #

OR-16521 ..... N82-33649 #

ORNL-TR-4825 ..... N82-34288 #

ORNL-5844 ..... N82-33512 #

ORNL/CSD-101 ..... N82-34117 #

ORNL/SUB-7676/2 ..... N82-34259 #

ORNL/TM-7076 ..... N82-34271 #
ORNL/TM-7895 ..... N82-34211 #
ORNL/TM-7943 ..... N82-34214 #
ORNL/TM-8022 ..... N82-33849 #
ORNL/TM-8098 ..... N82-33857 #
ORNL/TM-8276 ..... N82-33515 #

OU-AMNE-82-2 ..... N82-33778 #
OU-AMNE-82-3 ..... N82-33441 #
OU-AMNE-82-4 ..... N82-33776 #
OU-AMNE-82-5 ..... N82-33777 #

PAD-81-35 ..... N82-34310 #

PB82-155342 ..... N82-34120 #
PB82-155359 ..... N82-34121 #
PB82-155367 ..... N82-34122 #
PB82-155375 ..... N82-34123 #
PB82-155383 ..... N82-34124 #
PB82-155391 ..... N82-34125 #
PB82-168279 ..... N82-33943 #
PB82-168444 ..... N82-33581 #
PB82-169509 ..... N82-34100 #
PB82-169772 ..... N82-33907 #
PB82-170069 ..... N82-33575 #
PB82-170812 ..... N82-34299 #
PB82-171075 ..... N82-34331 #
PB82-171570 ..... N82-33886 #
PB82-172099 ..... N82-33944 #
PB82-172115 ..... N82-33945 #
PB82-172131 ..... N82-33963 #
PB82-172149 ..... N82-33964 #
PB82-172321 ..... N82-33573 #
PB82-172362 ..... N82-33817 #
PB82-172552 ..... N82-33547 #
PB82-172719 ..... N82-33812 #
PB82-172727 ..... N82-34086 #
PB82-172735 ..... N82-33546 #
PB82-172768 ..... N82-33816 #
PB82-172784 ..... N82-33815 #
PB82-172842 ..... N82-33811 #
PB82-173998 ..... N82-33491 #
PB82-174210 ..... N82-33967 #
PB82-174236 ..... N82-33631 #
PB82-174244 ..... N82-34025 #
PB82-174251 ..... N82-33908 #
PB82-174517 ..... N82-33576 #
PB82-174657 ..... N82-33906 #
PB82-174665 ..... N82-33905 #
PB82-174731 ..... N82-33720 #
PB82-175951 ..... N82-33810 #
PB82-176106 ..... N82-33814 #
PB82-176215 ..... N82-33809 #
PB82-176256 ..... N82-33582 #
PB82-176322 ..... N82-34099 #
PB82-176504 ..... N82-34024 #
PB82-176520 ..... N82-33813 #
PB82-176587 ..... N82-33518 #
PB82-176728 ..... N82-33447 #
PB82-176926 ..... N82-33885 #
PB82-176967 ..... N82-33966 #
PB82-177320 ..... N82-33808 #
PB82-177460 ..... N82-33490 #
PB82-177486 ..... N82-33887 #
PB82-177494 ..... N82-33489 #
PB82-177635 ..... N82-34158 #
PB82-177726 ..... N82-34332 #
PB82-177734 ..... N82-34333 #
PB82-177783 ..... N82-33960 #
PB82-177841 ..... N82-33580 #
PB82-177940 ..... N82-33579 #
PB82-178625 ..... N82-34159 #
PB82-178716 ..... N82-34023 #
PB82-178898 ..... N82-33965 #
PB82-179706 ..... N82-34334 #
PB82-180274 ..... N82-33884 #
PB82-180498 ..... N82-33909 #
PB82-180563 ..... N82-33904 #
PB82-180571 ..... N82-34160 #
PB82-180589 ..... N82-33578 #
PB82-180639 ..... N82-33577 #
PB82-180662 ..... N82-33488 #
PB82-180845 ..... N82-33883 #
PB82-180944 ..... N82-33880 #
PB82-180969 ..... N82-34035 #
PB82-181272 ..... N82-33881 #
PB82-181280 ..... N82-33807 #
PB82-181421 ..... N82-33446 #
PB82-182056 ..... N82-33903 #
PB82-182312 ..... N82-33445 #
PB82-182338 ..... N82-33574 #
PB82-183393 ..... N82-33882 #
PB82-183542 ..... N82-34305 #
PB82-185273 ..... N82-33902 #
PB82-188202 ..... N82-33821 #
PB82-190364 ..... N82-33820 #
PB82-190372 ..... N82-33819 #
PB82-190380 ..... N82-33818 #
PB82-193426 ..... N82-33633 #
PB82-195009 ..... N82-33694 #
PB82-195496 ..... N82-33632 #
PB82-197237 ..... N82-33590 #
PB82-198797 ..... N82-33679 #
PB82-200361 ..... N82-33371 #
PB82-201062 ..... N82-33591 #
PB82-201229 ..... N82-33589 #
PB82-201369 ..... N82-33588 #
PB82-201518 ..... N82-33786 #
PB82-201526 ..... N82-33587 #
PB82-201534 ..... N82-33680 #
PB82-202599 ..... N82-33586 #
PB82-202995 ..... N82-33519 #

PB82-204074 ..... N82-33910 #
PB82-204330 ..... N82-33787 #
PB82-204652 ..... N82-33722 #
PB82-204660 ..... N82-33721 #
PB82-204744 ..... N82-33585 #
PB82-205170 ..... N82-34196 #
PB82-207267 ..... N82-33584 #
PB82-207283 ..... N82-33583 #
PB82-208174 ..... N82-33560 #

PDRC-82-07 ..... N82-34136 #

PFC/CP/82-6 ..... N82-34269 #

PFC/RR-82-4 ..... N82-34118 #

PNL-3966 ..... N82-33875 #
PNL-4001-1 ..... N82-34261 #
PNL-4005 ..... N82-33673 #
PNL-4180 ..... N82-33872 #

POLY-EE/CS-82-003 ..... N82-34293 #
POLY-EE/CS-82-004 ..... N82-34294 #

PR-32 ..... N82-33618 #

PRC-R-3412 ..... N82-34088 #

PRI-41 ..... N82-34268 #

PUBL-17 ..... N82-33787 #

PWA-FR-15477 ..... N82-33428 #

PWA-5594-215 ..... N82-33394* #
PWA-5774-21 ..... N82-33391* #

QIFEL-011-81 ..... N82-33702 #

QPR-10 ..... N82-34089 #

QTR-2 ..... N82-34286 #

R-1571 ..... N82-33495* #

RA-81-1455 ..... N82-33822 #

RADC-TR-81-273 ..... N82-34088 #
RADC-TR-82-49 ..... N82-33604 #
RADC-TR-82-57 ..... N82-34219 #
RADC-TR-82-67 ..... N82-33613 #
RADC-TR-82-72 ..... N82-34143 #
RADC-TR-82-78 ..... N82-33612 #
RADC-TR-82-85 ..... N82-33603 #
RADC-TR-82-93 ..... N82-33718 #
RADC-TR-82-94 ..... N82-33614 #
RADC-TR-82-106 ..... N82-34109 #
RADC-TR-82-115 ..... N82-33649 #
RADC-TR-82-124 ..... N82-33647 #

RAE-TRANS-2083 ..... N82-33464 #

RAND/P-6681 ..... N82-34027 #
RAND/P-6682 ..... N82-33358 #

RAND/R-2750-RC ..... N82-34135 #

REPT-4 ..... N82-33689 #
REPT-4-25664 ..... N82-33650 #
REPT-6 ..... N82-34013 #
REPT-21-4410 ..... N82-33395 #
REPT-43 ..... N82-34291* #
REPT-50 ..... N82-33584 #
REPT-72-11 ..... N82-34163 #
REPT-76 ..... N82-33585 #
REPT-76-21-13 ..... N82-33431* #
REPT-80ASE142DR1-VOL-3 ..... N82-34312* #
REPT-81-401-400 ..... N82-34302 #
REPT-81LSP47251 ..... N82-33404* #
REPT-82-05 ..... N82-33336 #
REPT-82-09 ..... N82-34162 #
REPT-82-003-7776 ..... N82-33580 #
REPT-82/66S-277 ..... N82-33365 #
REPT-85 ..... N82-33721 #
REPT-86 ..... N82-33722 #
REPT-86 ..... N82-34270 #
REPT-115-80-7 ..... N82-34299 #
REPT-383 ..... N82-33386 #
REPT-1599-01-2-2711 ..... N82-33378 #
REPT-2258-21-3-2595 ..... N82-33384 #

RR-R81-3 ..... N82-33525* #

RR-82-8 ..... N82-34292 #
RR-91 ..... N82-33589 #

RRC-80-R-697 ..... N82-33840 #

R82AEB462 ..... N82-33393* #

SACLANTCEN-SM-154 ..... N82-33973 #

SAI-83-751-WA ..... N82-33969 #
SAI-131-81-343LJ ..... N82-33945 #
SAI-254-82-114-LJ ..... N82-34268 #

SAI/PL/MFE-2D-1-82 ..... N82-34142 #

SAM-TR-82-5 ..... N82-34010 #

SAND-80-1872 ..... N82-33556 #
SAND-81-0215 ..... N82-34217 #
SAND-81-1810/2 ..... N82-33942 #
SAND-81-2618 ..... N82-33939 #
SAND-81-7033 ..... N82-33861 #
SAND-81-7088/4 ..... N82-33879 #
SAND-81-7100-6 ..... N82-33846 #
SAND-81-7100/8 ..... N82-33858 #
SAND-81-8162 ..... N82-33840 #
SAND-82-0004 ..... N82-33786 #
SAND-82-0470 ..... N82-33630 #
SAND-82-0800 ..... N82-34116 #
SAND-82-8215 ..... N82-33656 #

SAR-42 ..... N82-33434* #

SASR-1 ..... N82-33374* #

SATR-2 ..... N82-34091 #
SATR-5 ..... N82-34199 #

SC5202.17SA ..... N82-34199 #
SC5227-1FR ..... N82-33499 #

SD-TR-82-26 ..... N82-33836 #
SD-TR-82-31 ..... N82-33623 #
SD-TR-82-60 ..... N82-34218 #
SD-TR-82-63 ..... N82-33823 #

SDL-82-2188-07F ..... N82-33723 #

SERI/PR-234-1456 ..... N82-33478 #
SERI/PR-8143-1-T6 ..... N82-33842 #

SERI/TR-211-1400 ..... N82-33962 #
SERI/TR-9243-1-T1 ..... N82-33867 #
SERI/TR-98073-1B ..... N82-33854 #
SERI/TR-98133-1B ..... N82-33843 #

SGD-446-PT-1 ..... N82-34331 #
SGD-447-PT-1 ..... N82-34332 #
SGD-447-PT-2 ..... N82-34333 #

SOLAR/0010-82/01 ..... N82-33959 #

SPC-774 ..... N82-33379 #

SR-2 ..... N82-33938 #

SRA-R82-920013-4 ..... N82-34277 #

SR81-R-4761-21 ..... N82-33827* #
SR82-R-4792-28 ..... N82-33494* #

SSEC/SP-32266 ..... N82-33844 #

SSEC/TP-31262 ..... N82-33961 #
SSEC/TP-41300 ..... N82-33853 #

SSL-21-82-VOL-1 ..... N82-34127* #
SSL-23-82-VOL-3 ..... N82-34128* #

SSS-R-81-5138 ..... N82-33932 #

SU-DMS-82-R-3 ..... N82-33511 #

SU-HTGL-134 ..... N82-33869 #

SU-SOL-82-7 ..... N82-34114 #

SU-SUIPR-931 ..... N82-34327* #

SU-TF-17 ..... N82-33664 #

SUPRI-TR-32 ..... N82-33862 #

SWRI-6800-110 ..... N82-33550 #
SWRI-6800-299 ..... N82-33526 #

TACOM-TR-12648 ..... N82-33784 #

TAE-404 ..... N82-33731 #

TAE-439 ..... N82-33730 #
TAE-446 ..... N82-33732 #
TAE-447 ..... N82-33492 #

TE4229-188-82 ..... N82-33577 #

TPR-3 ..... N82-33660 #

TR-B-6 ..... N82-34153 #

TR-D-54-ARO ..... N82-34155 #

TR-D52-ARO ..... N82-34161 #

TR-EE-82-21 ..... N82-33645 #

TR-GL-97-7 ..... N82-33892 #

TR-N-28 ..... N82-34174 #
TR-N-29 ..... N82-34173 #
TR-N-30 ..... N82-34175 #
TR-N-31 ..... N82-34146 #
TR-N-32 ..... N82-34176 #
TR-N-33 ..... N82-34145 #

TR-ONR-6 ..... N82-34034 #

TR-1 ..... N82-33652 #
TR-1 ..... N82-33725 #
TR-1 ..... N82-34202 #
TR-2 ..... N82-34026 #
TR-5 ..... N82-34004 #
TR-5 ..... N82-34195 #
TR-8 ..... N82-33471 #
TR-9 ..... N82-34200 #
TR-10 ..... N82-33470 #
TR-10-PT-1 ..... N82-34104 #
TR-11-PT-2 ..... N82-34105 #
TR-14 ..... N82-34106 #
TR-18 ..... N82-33536 #
TR-24 ..... N82-33472 #
TR-25 ..... N82-33473 #
TR-26 ..... N82-33466 #
TR-26 ..... N82-33778 #
TR-27 ..... N82-33441 #
TR-28 ..... N82-33776 #
TR-29 ..... N82-33780 #
TR-30 ..... N82-33777 #
TR-49 ..... N82-33538 #
TR-81-34 ..... N82-34164 #
TR-82-11 ..... N82-34090 #
TR-82-18 ..... N82-34165 #
TR-106-11 ..... N82-34181 #
TR-112-11 ..... N82-34003 #
TR-120A ..... N82-34193 #
TR-157 ..... N82-34167 #
TR-158 ..... N82-34169 #
TR-159 ..... N82-34144 #
TR-160 ..... N82-34171 #
TR-161 ..... N82-34170 #
TR-163 ..... N82-34172 #
TR-164 ..... N82-34168 #
TR-204-SER-2 ..... N82-34180 #
TR-216-SER-2 ..... N82-33931 #
TR-600 ..... N82-33615 #
TR-610 ..... N82-34324 #
TR-611 ..... N82-34150 #
TR-0082(2495-01)-5 ..... N82-33823 #
TR-0082(2940-03)-1 ..... N82-34218 #
TR-0082(2940-06)-2 ..... N82-33623 #
TR-0082(2945-01)-2 ..... N82-33836 #
TR-1151 ..... N82-34110 #

TRRL-SUPPL-706 ..... N82-33586 #

TRW-37255-6001-UT-VOL-1 ..... N82-33424* #
TRW-37255-6002-UT-VOL-2 ..... N82-33425* #

TTU/IDR-61D ..... N82-33546 #

UCID-19319 ..... N82-33482 #

UCRL-53189 ..... N82-33514 #
UCRL-53213 ..... N82-33675 #
UCRL-53214 ..... N82-33676 #
UCRL-53243 ..... N82-34272 #
UCRL-53264-VOL-1 ..... N82-33444 #

UCSD-SP-82-17 ..... N82-34330 #

UDR-TR-82-71 ..... N82-33531 #
UDR-TR-82-119 ..... N82-33738* #

UDRI-TR-81-159-VOL-1 ..... N82-33361 #

UI-82-5 ..... N82-34326* #

UIEM-82-4 ..... N82-33624 #

UILU-ENG-80-2538 ..... N82-33612 #
UILU-ENG-82-2542 ..... N82-33624 #

US-PATENT-APPL-SN-149526 ..... N82-33996*
US-PATENT-APPL-SN-172100 ..... N82-33520*
US-PATENT-APPL-SN-218588 ..... N82-33521*
US-PATENT-APPL-SN-392095 ..... N82-33419* #
US-PATENT-APPL-SN-392096 ..... N82-33372* #
US-PATENT-APPL-SN-403371 ..... N82-33523* #
US-PATENT-APPL-SN-403378 ..... N82-33522* #
US-PATENT-APPL-SN-403847 ..... N82-33567* #
US-PATENT-APPL-SN-403848 ..... N82-33593* #
US-PATENT-APPL-SN-403849 ..... N82-33681* #
US-PATENT-APPL-SN-409678 ..... N82-33712* #
US-PATENT-APPL-SN-409679 ..... N82-33634* #
US-PATENT-APPL-SN-918705 ..... N82-33996*

US-PATENT-CLASS-128-422 ..... N82-33996*
US-PATENT-CLASS-128-734 ..... N82-33996*
US-PATENT-CLASS-128-804 ..... N82-33996*
US-PATENT-CLASS-204-38B N82-33521*
US-PATENT-CLASS-204-192E N82-33521*
US-PATENT-CLASS-204-192EC N82-33521*
US-PATENT-CLASS-427-140 ..... N82-33520*
US-PATENT-CLASS-427-372.2 ..... N82-33520*
US-PATENT-CLASS-427-397.7 ..... N82-33520*
US-PATENT-CLASS-428-141 ..... N82-33521*

US-PATENT-4,330,572 ..... N82-33520*
US-PATENT-4,344,996 ..... N82-33521*
US-PATENT-4,346,715 ..... N82-33996*

USAAVRADCOM-TR-79-0270-4 ..... N82-33386 #
USAAVRADCOM-TR-82-D-4 ..... N82-33716 #
USAAVRADCOM-TR-82-D-6 ..... N82-34231 #

USARIEM-M-33/82 ..... N82-34006 #
USARIEM-M-34/82 ..... N82-33984 #

USARIEM-M27/82 ..... N82-34017 #
USARIEM-M28/82 ..... N82-34015 #

USARIEM-T-3/82 ..... N82-34021 #

USCG-D-19-82 ..... N82-34087 #
USCG-D-20-82 ..... N82-34230 #
USCG-D-26-82 ..... N82-33894 #

USGS-GD-82-0022 ..... N82-33943 #

USGS-WDR-LA-81-VOL-3 ..... N82-33821 #

USGS-WDR-OR-80-VOL-2 ..... N82-33820 #

USGS-WDR-PA-80-VOL-1 ..... N82-33819 #

USGS/WDR/AR-80/1 ..... N82-33818 #

USGS/WDR/HD-81/011-VOL-1 ..... N82-33819 #
USGS/WDR/HD-81/012-VOL-3 ..... N82-33821 #

USGS/WRD/HD-81/006 ..... N82-33818 #
USGS/WRD/HD-81/010-VOL-2 ..... N82-33820 #

USGS/WRD/WRI-82-005 ..... N82-33813 #

USGS/WRI-81-59 ..... N82-33813 #

UTEC-82-063ARO-17126.4-EG ..... N82-33443 #

UTSI-82-5 ..... N82-33396 #

UVA-ER-705-81U ..... N82-33674 #

VPI-AERO-108 ..... N82-33339* #

VPI-E-82.19 ..... N82-33780 #
VPI-E-82.20 ..... N82-33776 #

WES-INSTRUCTION-K-80-4 ..... N82-33772 #

WES/MP/GL-82-2 ..... N82-33926 #

WES/MP/SL-82-1 ..... N82-33768 #
WES/MP/SL-82-2 ..... N82-33769 #

WES/TR/GL-82-3 ..... N82-33927 #

WES/TR/HL-82-8-APP-A/B ..... N82-33717 #

WES/WIS-4 ..... N82-33958 #

WGRL-82-1 ..... N82-34016 #

WHOI-82-11 ..... N82-33974* #
WHOI-82-27 ..... N82-34095 #
WHOI-82-31 ..... N82-33929 #

WIS-PH-81-50 ..... N82-34289 #

WIS-7 ..... N82-33951 #

Y-2269 ..... N82-33510 #

170445 ..... N82-33635* #

☆U.S. GOVERNMENT PRINTING OFFICE: 1982-381-564:2023

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*' from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business

Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

U.S.MAIL

9 1 STAR, 821221 S01733HU
UNIV OF MICHIGAN
GRADUATE LIBRARY
DOCUMENT UNIT SERIALS DIV
ANN HARBOR MI 48109

Undeliverable (Section 158
stal Manual) Do Not Return

C37